DOCUMENT RESUME

ED 144 522 IR 004 727

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TITLE A Study of the Potential for Sharing Education Periodicals among the Southern UC Campuses.
PUB DATE 3 Aug 76
NOTE 126p.; Master's Thesis, University of California at Los Angeles

EDRS PRICE MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS Cost Effectiveness; *Costs; Information Systems; Interlibrary Loans; *Periodicals; Tables (Data); *University Libraries
IDENTIFIERS University of California

ABSTRACT

This study reports on an examination of the overlap of periodicals that are related to the discipline of education and that are currently received by the five southern University of California (UC) campuses. An estimate is made of the percentage of these commonly held periodicals that could be more economically borrowed from a regional resource library such as UCLA, than owned individually by another southern campus. The basis for the analysis is a comparison of the cost per loan in an efficiently designed interlibrary loan system, with the cost per use for each title at each library, based upon recorded circulation and projected demand. Estimates are made of the cost per loan, the total cost of owning a periodical, and the projected demand for volumes to be received in the next ten years. Results of the analysis suggest that between one-third and one-half of the total number of periodical titles studied could be more economically borrowed than owned. It is concluded that there is considerable potential for the sharing of periodicals related to education by the southern UC campuses. (Author)

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A STUDY OF THE POTENTIAL FOR SHARING EDUCATION PERIODICALS AMONG THE SOUTHERN UC CAMPUSES

Jeffrey C. Griffith

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August 3, 1976

Submitted in Partial Fulfillment
of the Requirements for the
MLS Degree

Graduate School of Library and
Information Science,
University of California
at Los Angeles

IR004727

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Results of the analysis suggest that between one-third and one-half of the total number of periodical titles studied could be more economically borrowed than owned. It is concluded that there is considerable potential for the sharing of periodicals related to education by the southern UC campuses.

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I

INTRODUCTION

BACKGROUND

The General Problem

The continually rising costs of owning books and serials, the life blood of most academic libraries, is a well documented fact.[1] The two forces which are the major contributors to this upward spiral are:

1. The increase in the total number of books and journal articles published each year.

2. The increase in the cost of producing, acquiring, processing, and storing these works.

The result of this inflationary pressure on academic libraries was summarized in 1973 by the California State Department of Finance Audit and Budget Division as follows: "Thus, the information explosion and the continued acceleration of inflation have together created a situation in which it has become increasingly difficult for libraries to purchase a constant proportion of the publication market. Libraries have, in fact been buying progressively less and lss of the market each year for some time now.... Thus, at the present rate of increase in book prices and titles published, acquisitions budgets would have to more than double every four years in order

for libraries to purchase a constant proportion of the publication market year after year."[2]

Like other public institutions, libraries have access to a finite amount of resources. What has turned the present situation into a problem of severe dimensions is that the funding agencies, themselves beset on all sides with increasing demands and relatively diminishing resources, have not matched need with equivalent buying power. Some have not done so because they were unwilling or unable; others because they have used different indices than the libraries have used in assessing the amount of that need. The result for academic libraries has been a series of ad hoc measures that have enabled budgets to be balanced, but no satisfactory long term solutions to be developed.

Underlying this financial crisis, and complicating the search for solutions is the fact that academic libraries have traditionally been judged by the size or completeness of their collections. Size is one valid criterion of strength, for certainly the larger a library's collection, the more likely a user will be able to satisfy his information needs there. The difficulty arises when the prestige value of absolute size becomes an end in itself and is allowed to negate viable alternatives for satisfying collection access needs.

Ways of Coping

After subscriptions and staff have been cut to the bone the most apparent solution to the problem, barring technological breakthroughs, lies in the possibility of sharing resources. Libraries have always recognized the impossibility of owning everything desirable. Inter-library loan (ILL) has long played an important role in library effectiveness as measured by the ability to provide a specific work to a user. To date, however, ILL has accounted for only a small fraction of most academic libraries' total circulation. It has been more in the nature of a gentleman's agreement, formalized by certain established procedures, but nothing more binding in fact than a sense of mutual obligation. The costs[3] of making such loans are not trivial, though, and some libraries have found it necessary to charge for that service.

Spiralling acquisitions costs, however, have given a new urgency to effective ILL. This heretofore docile extramural arm of the library is being examined anew to see how much of a load it can bear and to determine whether it can offer any relief from the cost pressures of book ownership.[4]

Similarly, library networks are being given closer scrutiny to determine how much such organizations can help to reduce costs. To date there have been several significant prototypes in operation, such as the New

York State NYSILL program and the regional medical library system which have broken important ground and are demonstrating effective ways of sharing resources. In addition, the development of the National Lending Library in Great Britain is an example of a national program aimed at improving access while lowering the costs of owning for local libraries.

Response of the University of California

Like other libraries, those of the University of California have been subject to these same cost pressures. There has always been a considerable degree of sharing among the UC libraries. Total intra-UC ILL was over 30,000 items in 1974-75. But with annual acquisitions of over 500,000 volumes, annual circulation counted in the millions and total collection size in the tens of millions, the degree of existing cooperative efforts as represented by ILL is relatively small. Various pressures have forced a ceiling on total annual acquisitions. There has been pressure on the UC libraries from the University administration and also from the state Finance Department to develop much more extensive plans and programs for cooperative efforts aimed at sharing resources and reducing operating costs.[5]

In 1974 a Library Policy Task Force was appointed by the UC President and "...charged with the responsibility

of reviewing basic library policies. It was directed to concentrate on broad policy issues, to take a systems approach to library planning, and to confront the issues of exponential growth and regional planning."[6] That task force completed its work in two months and issued a report which included the following four basic assumptions/ tenets of library planning.

1. The library holdings of all the campuses should be considered as a single University collection rather than nine separate collections.

2. The University library collection should be developed and maintained in close relation to the University and campus academic plans.

3. Policies for acquisition and operation, and the implementation of such policies, should be designed to make the most effective use of available funds.

4. Each campus should have a collection which, in conjunction with the other elements of the University library system, is fully adequate to support the programs of instruction and research approved for the campus.[7]

(emphasis added)

The report was accepted, and in 1975 the task force itself was reconstituted into the Steering Committee for Systemwide Library Policy Implementation. The Steering Committee is administratively responsible to the UC Vice President-Academic Affairs and Personnel. It is charged now "...to implement the policies set forth in the Library Policy Task Force Report."[8] To carry out its charge, the Steering Committee:

1. Has selected an Executive Director of University-wide Library Planning.

2. Is translating the LPTF Report into specific objectives.

3. Is planning a time schedule for implementation of these objectives.

The new executive director of library planning for UC has prepared a Preliminary Plan[9] for library coordination that has focused on the steps required to implement the LPTF recommendations, especially the concept of the single university collection. Particular attention is also given in that draft to the need for adequate study and analysis of alternatives before plans are made operational.

The concept of a single UC collection is worthy of evaluation on its own merits, regardless of the economic or political pressures that may have pushed it to the fore. If the operational result of such a concept is that a user will have reliable, rapid, and convenient access to a much larger collection than the one that exists on his local campus, then it may be a worthy idea. If, on the other hand, it means delays, fewer local resources, and inconvenient access to the user, then it is not a solution at all. Or if it means higher costs per transaction and cumbersome and unworkable acquisition plans, then the criteria that brought it into being would force it to be abandoned or drastically revised.

Above all, such a concept requires controlled and

reliable testing and examination. This paper will report on research designed to explore one potential functional aspect of the single collection concept: the sharing (among the southern UC campuses) of periodicals related to a single discipline. Periodicals have been selected for study for two reasons. First, previous research has supported the possibility that the past use of volumes can be used to predict the use of future volumes of the same title.[10] This predictive relationship, if confirmed by other studies, provides a distinct advantage in trying to identify material that would be more economically shared than owned in the future. Second, they represent a significant and constant portion of a library's annual budget. We shall focus on one discipline because of the finding[11] that patterns of use of books and serials varies among disciplines. Before describing the results of this investigation, however, we shall review the research related to sharing among the UC campuses.

Related Research

There has been an important although small body of research conducted within the past two years that related specifically to the University of California and the questions examined in this report. These reports will be reviewed here.

The California Department of Finance Audit Division,

an agency understandably concerned with the growing size of budgets, and the possible degree of duplication of holdings, made one of the first, and certainly the most sweeping proposal for library coordination. Although the plan[12] was specifically designed for the CSUC system, it was made clear that the approach suggested should be equally applicable to UC. The auditors began by developing an algorithm for classifying patron use of monographs into high (basically at least once every four years), infrequent (less than once every four years), and no use (no evidence of recorded use). Using the Bayes Theorem to estimate the correction necessary to account for in-house use, they concluded that for CSUC:

63-68% of the monographs fell into the high use category.

5-8% of the monographs fell into the infrequent use category.

25-30% of the monographs fell into the no use category.

After examining the extent of duplication of monographs and studying patron use of the commonly held works, the auditors recommended a system in which.

1. Duplication of infrequently or never used works was minimized.

2. 48-hour delivery of non-duplicated works would be guaranteed from the holding library.

3. Collection development guidelines would be established, based on subject specialization, and designed to minimize duplicate acquisition of low use volumes.

4. 1-2 million dollars would be saved over current acquisitions and processing costs.

This model was subjected to several sharp criticisms, however. Evans[13] summarized its weaknesses very effectively. The most crucial of these were that:

1. The costs used to calculate acquisitions and processing costs included serials as well as monographs, although the plan dealt only with monographs.

2. Successful implementation depended upon an as yet undeveloped means of predicting use of monographs.

3. Costs of ILL were grossly underestimated.

4. Time frame and administrative procedures were impossible or totally lacking.

Martel[14] took the auditor's formulas as the basis for a study of overlap and use patterns of documents held by UCB and Cal State, Sacramento. His report highlighted a basic contradiction of the auditor's proposal that a library not acquire low use books, but not be allowed to borrow high use books from another library. When a work is (somehow known to be) low use at one library and therefore cannot be acquired, but high use at another library, it is basically unattainable for the

first library. An estimated 30% of the titles held in common by UCB and CS Sacramento fell into this category. Martel[14] correctly pointed out that either the formule would have to be changed or eliminated or the no queue requirement would have to be dropped.

Thompson and Dougherty[15] conducted a study of serials overlap among the northern UC campuses. Circulation data "... were obtained from one bound volume per decade of publication for each title located ..."[16] and serials were classified into five levels of patron use. Further collapsing the demand categories into high and low, Thompson found that titles owned by only one campus are more likely to fall into the low use category than titles owned by two, three, or four campuses. Although he computed the percentage of currently received serials falling into high and low use categories at each library, he did not compute the percentage of commonly held, currently received serials that fell into each demand category.

Bourne's[17] investigation of health science serials is closer to the approach to be used in this paper. Bourne collected data on subscription costs, duplicate holdings and recorded patron use of 600 exotic language serials held by libraries in several geographically related networks (UC, CSUC, Medical Region XI). By applying the criterion of amount of patron use/title to

the variable of number of allowed duplicate subscriptions to that title, he was able to calculate total subscription cost savings to the system as a whole. Bourne's research had the advantage of reporting the actual number of circulations/year rather than of using a derived, value laden category such as "high" or "low." By varying the specific level of patron use employed as the criterion for cancellation, he was able to compute various levels of total savings. He did not, however, include costs of ILL or estimates of in-house use. Also, data on patron use does not appear to have been obtained or utilized systematically or rigorously, e.g. data on patron use was collected from only some of the libraries in the system. Data on the use of each title from only one library (whichever had the highest circulation for that title) was used to estimate the average annual circulation for that journal.

OBJECTIVES OF THE STUDY

The primary purposes of the research reported here are as follows:

(1) To determine the degree of overlap* in periodicals** (in the field of education***) that are currently received (and have been received for at least five years) by UCLA and by at least one other southern UC campus.

(2) To estimate the percentage of those periodicals that could be more economically made available to patrons at Santa Barbara, Riverside, Irvine and San Diego by borrowing from UCLA (using special interlibrary loan procedures) rather than by owning.****

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*The phrase "overlap in periodicals" will be used in this report to refer to those periodical titles that are received by UCLA and by at least one other southern campus. It will not refer to titles that are received by at least two southern campuses but not by UCLA.

**Periodicals will be used in this report to refer to serial publications that are received as unbound issues at least twice a year.

***For the sake of brevity the term periodicals as used in this report should be understood to refer only to periodicals related to the discipline of education. Statements that are applicable to periodicals in all disciplines will be explicitly identified.

****In making this estimate we are assuming that UCLA would be designated the southern UC regional resource center in a system designed to lower library costs through shared acquisitions. "Southern campuses," "southern network" and "southern region" will be used in this report to refer to UCLA, Santa Barbara, Riverside, Irvine, and San Diego.

In pursuing these goals we shall have to build upon several important blocks of information. These include:

(1) A description of a possible ILL system specifically designed to be a low cost, rapid method for the loan of periodical articles among the southern campuses.

(2) An estimate of the cost per loan in such a system.

(3) An estimate of the cost of owning a periodical.

(4) An estimate of the use of each of the commonly held education periodicals at each of the southern campuses (except UCLA).

Using the above information we will calculate the percentage of subscriptions to commonly held periodicals whose cost per use would justify borrowing rather than owning.

Approaching the Problem

In this report the basic approach to the problem of whether and how to establish a network for sharing periodical holdings will be at the level of the manager who must make such decisions. That is, given the information that is currently available to (or can be readily acquired by) the manager, what decision might be made today about the sharing of education periodicals among southern campuses? There will be obvious limitations to the confidence that can be placed in that decision. The reality of library administration, however, is that such decisions are being made today, and are likely to continue being made for some time. This report aims,

therefore, at contributing to the rationality of some of those decisions by identifying the information needed and currently available for helping to make such choices. Clearly, many assumptions must be made in such decision making procedures, and these assumptions will be explicitly identified throughout this report. It is understood that these assumptions are fertile ground for the more basic research that must take place in librarianship in order to advance the state of fundamental knowledge in the discipline.

The author's own expectations with respect to the basic questions examined in this report should be noted. The work of several social psychologists have indicated that a researcher's expectations about the outcome of his research can subtly but significantly influence the results in the direction of the expected outcome. Safeguards are difficult to build into the research process and readers should at least be forewarned about what the author expected his research would find.

The conjecture of the author in this case was that there probably would be some small percentage of subscriptions to titles that could be more economically shared than owned. The size of that percentage was "guessed" to be under 10%, but it was understood that one outcome of the research might well have been to suggest very little uneconomical duplication in holdings. The

reason for this expectation was that the periodicals being studied had characteristics that are usually associated with high use. They were (1) in English, (2) currently received, and (3) held by more than one university library.

Finally, it is important to note the author's assumptions about error. Before undertaking this research, 10% was established as the "tolerable" range for error. Thus, for example, if the particular amount estimated in this study as the average annual cost of processing a periodical differs from the amount actually spent by a particular library by 10% or less, the amount of difference (or the error in the estimate) is assumed to be acceptable.

References and Notes

1. California. Department of Finance. Program Review Branch. Audit Division, Library Cooperation: A Systems Approach to Interinstitutional Resource Utilization, (Sacramento: California Department of Finance, 1973).

Libraries at Large. Tradition, Innovation, and the National Interest. Douglas Knight and E. Shepley Nourse, ed., (New York: Bowker, 1969).

2. California. Department of Finance, op. cit., pp. 17-18.

3. A Study of the Characteristics, Costs, and Magnitude of Interlibrary Loans in Academic Libraries, Vernon Palmour, Edward C. Bryant, Mary W. Caldwell, and Lucy M. Gray, compilers, (Washington, D.C.: Association of Research Libraries, 1972).

4. California. Department of Finance, op. cit.

Gordon Williams, et al., Library Cost Models: Owning versus Borrowing Serial Publications, (Washington, D.C.: Office of Science Information Service, National Science Foundation, 1968).

5. California. Department of Finance, op. cit.

University of California, Charge to the Steering Committee for Systemwide Library Policy Implementation, (Berkeley: University of California, 1975).

6. University of California. Library Policy Task Force, Report of the Library Policy Task. University of California Library Policy to 1980-81, (Berkeley: University of California, 1974), p. 1.

7. Ibid., p. 2.

8. University of California, Charge to the Steering Committee, op. cit., p. 1.

9. Preliminary Plan for the University of California Libraries, 1976-1986, (Berkeley: University of California, Office of the Executive Director of Library Planning, January 1976).

10. These references will be discussed in Section IV.

11. Herman H. Fussler and Julian Simon, Patterns in the Use of Books in Large Research Libraries, (Chicago: University of Chicago Press, 1969).

12. California. Department of Finance, op. cit.

13. G. Edward Evans, "The California State Department of Finance Report. Analysis of 'Library Cooperation: A Systems Approach to Interinstitutional Resource Utilization,'" California Librarian, 34 (April 1973), 4-15.

14. Charles Martel, Document Availability and Use Patterns at the University of California, Berkeley Library: A Comparison with California State University, Sacramento, (Berkeley: University of California, Institute of Library Research, 1975).

15. Donald D. Thompson and Richard M. Dougherty, Preliminary Summary Report on the Feasibility of Expanded Library Cooperation among the Northern Campuses of the University of California: A Study of Periodicals Overlap and Patterns of Use, (August 1974).

16. Ibid., p. 15.

17. Charles P. Bourne and Dorothy Gregor, Methodology and Background Information to Assist the Planning of Serials Cancellation and Cooperative Serials Collection in the Health Sciences, (Berkeley: University of California: Institute of Library Research, 1975).

II

COSTS OF BORROWING A PERIODICAL ARTICLE

The major study of ILL costs for academic libraries conducted by Westat in 1972[1] estimated the combined cost to the borrowing and lending library at approximately $10 per filled request. At that rate even many low use journals would be more economically owned than borrowed. The purpose of this section, therefore, is to estimate the minimal costs that would have to be borne by the member libraries of a consortium whose objective is lower costs through shared resources. The goal here is not to propose a revision of long established ILL procedures that have purposefully been designed to insure delivery of a great variety of materials to a great variety of users. Rather the objective is to identify the minimum costs for a narrow spectrum of the total system. In order to make these estimates, we shall have to describe alternative ILL procedures that are specifically aimed at reducing library costs to the lowest feasible level and yet still provide for the delivery of periodical articles. It should be noted that although the estimates thus derived are quite low compared to those of the Westat study, they are consistent with the actual costs for the loan of periodical articles estimated by a major regional medical library.[2]

MINIMUM COST PROCEDURES

We would assume first the existence of a bibliographically complete union catalog listing the call number and location of all shared materials within a consortium. A primary means of cost reduction would therefore be the elimination of the identification and verification of the item by the borrowing library staff, and the shifting of these tasks to the patron as follows: A patron who needs to locate a journal article would first go to the union list (there would be no separate local list). For serials found to be held locally, he would follow the usual procedures for that library. For serials found to be held at the regional library, the patron would complete a request form showing all information necessary to locate and make a photocopy of the item. This form would then be checked at the reference desk solely to insure completeness and to spot any obvious error in transcription. No bibliographic verification would be conducted by the reference staff, however.

There are several reasons for believing such a procedure would be feasible. The patron is being asked to provide the same information he would need in order to locate the serial at his own library, with readable transcription being the only additional requirement. Assuming he finds a match between the title he is seeking and the title listed in the union serial catalog, we should be able to assume a high probability for the accurate transmission of the needed re-

quest information. The alternative of verifying every request would make the system much too costly to be a reasonable alternative to ownership. Should the patron not find a match between his sought title and the titles listed in the catalog, he would seek reference help--a step he would have to take whether the title were owned by the local library or held at the regional library.

This procedure would, as noted, shift to the user the major cost of locating and verifying a source, but only for items that (one hopes) should be relatively easy to identify in a well constructed union catalog. The shift would make more demands on the patron's elementary bibliographic skills, and thus more demands on the library's user-education effort.

Lending library costs could also be reduced by the elimination of verification and identification. Because the call number of the periodical would be one of the pieces of information on the request form, the article could immediately be retrieved and copied. If the item could not be found because of bibliographic error, a form letter could be sent to the patron, identifying the problem and recommending that he seek assistance from his reference staff.

To eliminate handling costs at the borrowing library, the copied article could be transmitted directly to the patron at his home or office. To insure the speediest turnaround, it would be reasonable to require that no titles in the shared collection would circulate. Also, it must be assumed that

copyright legislation would not be prohibitive. In our cost estimates, however, we shall include a fee paid to the publisher for reproducing copyrighted material.

Record keeping requirements in a consortium could be minimal. First, the total number of pages copied and requests filed could be accumulated annually as justification for the required level of central funding. It would also be valuable to have request cards filed first by the name of the borrowing library, and within each library, by title. This file could be scanned annually to identify any titles being requested so frequently by a particular library that they should be reviewed as candidates for acquisition by that library. If an on-line system of communication were employed, the record keeping would, of course, be automatically accomplished. Given the small number of records required, however, the cost estimates used in this paper will be based on a manual system.

LIMITATIONS OF THE ALTERNATIVE PROCEDURES

We should reiterate the limitations of these minimum cost procedures:

1. They require a bibliographically complete union catalog that is understandable to a patron.

2. They rely primarily on the ability of the patron to complete a request form correctly or to seek help when a problem arises.

3. They are restricted to the loan of articles from particular periodicals that are known to be shared by members

of a consortium.

There is no implication here that these procedures or their derived costs would be applicable or feasible under conditions that differ from the above.

MINIMAL COSTS OF LENDING

Costs of the lending procedures described above are presented in Table II-A in 1976 dollars. Notes following II-A provide the documentation and rationale for each value selected. In this case, the available sources presented the data in terms of money rather than time. The estimates include all direct and indirect labor and salary related benefits (estimated at 15%). As with the costs of owning, these estimates do not include rent and supplies overhead nor general administrative expenses. The total estimated cost per loan for the procedures described is $3.00. In the results section of this report we shall consider the effect if that estimate were increased by 50%.

THE PROBLEM OF DELAYED ACCESS

The cost to the user of delayed access is difficult to assess and would have to be compensated for by two features. First, the patron would receive a free photocopy of the item. (This assumes the system designers accept the rationale that a user in the system is entitled to a free copy if the local library drops a subscription because of a regional loan availability.) Second, the user would not have to go to the

trouble of retrieving the item himself, a task which often can be time consuming and/or frustrating in a large research library.

The importance of time and the impact on timely or immediate access that an extensive shared acquisitions and loan program would have must not be underestimated, however. There are three aspects to the time problem that need specific mention. First, in relation to this specific study the criterion of time required to achieve access is not considered in the measure of effectiveness used here. Delivery is the essential standard employed in this investigation, with the assumption of a "reasonable" time period for transportation.

Second, the assumption made in this study is that a time delay would not reduce the number of uses made of a periodical. If we project five uses for a title if owned, we will predict five uses if borrowed.

Third, there is the problem of uses for which delay is unacceptable. An example might be the following. An individual is planning a line of activity based upon his reading of the sources available to him. His decision process is such that each article read influences the choices made and the directions taken. If the planning is being done within a particular time constraint, the individual may forego an article if it is available only by loan rather than delay a decision that would be influenced by that article, but which must be made before his work continues. If the choice

that is made would have been different if the periodical with the article had been held locally and read, we would have an example of a significant loss due to the lack of availability.

The potential effects of time must, regrettably, remain acknowledged but unmeasured.

References and Notes

1. A Study of the Characteristics, Costs and Magnitude of Interlibrary Loans in Academic Libraries, Vernon Palmour, Edward C. Bryant, Mary W. Caldwell, and Lucy M. Gray, compilers, (Washington, D.C.: Association of Research Libraries, 1972).

2. Personal communication from librarian in charge of regional medical library lending activities at the UCLA Bio-medical library.

III

COSTS OF OWNING A PERIODICAL

CATEGORIES OF EXPENSES

The expense categories involved in owning a periodical are identified as follows:

1. One time costs:
   - A. Acquiring the periodical (initial identification, verification, pre-acquisition search of the catalog, and placement of the order)
   - B. Cataloguing the periodical
2. Recurring annual costs:
   - A. Receiving
   - B. Checking in and updating of records
   - C. Initial shelving
   - D. Claiming
   - E. Preparation for binding (record preparation and updating, physical handling, reshelving upon receipt)
   - F. Renewal of subscription
   - G. Binding
   - H. Storing
   - I. Subscription

COSTS PER FUNCTION

Each of the above tasks could be broken down into more

discrete components to arrive at a more precise estimate of the times involved in periodical maintenance. However, this list already exceeds in detail most of the reported cost studies reviewed for this research. Table III-A lists the tasks and their estimated times for completion that are used in this study to estimate the costs of maintaining and processing one title in a manual system. Only the recurrent annual costs are calculated because the primary focus of this study is the savings that might result from the cancellation of current subscriptions for which the costs of acquiring and cataloging have already been borne by the library. The estimates in Table III-A are based on the costs of a manual system because a review of the literature was unable to locate any consistent tendency for automated systems to significantly reduce the costs of serial maintenance when that function is considered by itself. (See particularly Palmer,[1] Grosch,[2] Fayollat,[3] Verity[4].) Although Koenig[5] did report some savings, others have found increased costs per title over the manual system used prior to automation.) A primary justification for automation of serials control has not been that it reduces unit costs but that it permits additional services and capabilities once serials are under machine control. By using the cost estimates for a manual system, therefore, we are selecting the more cost effective alternative for maintenance when that function is considered alone.

Table III-A lists tasks by times in order that the effect

of differences in task efficiency and salary rates can be assessed. (Binding and storage costs, however, are given in dollars.) The notes following III-A identify the sources used in calculating the estimated times per task and the rationale for selecting the particular estimate shown from among the various figures reported in the literature.

ESTIMATED COSTS OF MAINTAINING AN AVERAGE PERIODICAL

If we assume an average of five issues received per year per periodical,[6] we can use the values in Table III-A to arrive at an estimate of 1.2 hours of direct labor per year per average periodical. (See Appendix A for the exact formula used in computing the cost of processing. Note this figure of 1.2 hours is exclusive of binding costs, which are assumed to be performed by an outside contractor, or storage costs and subscription costs.) This estimate is for direct labor only and, following Hayes,[7] we need to multiply this figure by 1.5 to arrive at total labor required. (1.2 x 1.5 = 1.8 hrs.) This figure, multiplied by the total periodicals received, should provide an estimate of the staff required to handle that many titles, assuming the average rate of issue remains five.

To obtain the total labor cost in dollars we would next multiply 1.8 by the factor used to compute salary related benefits (1.15 is used in this study), and by the salary rate ($4.00/hr is used in this study). The appropriate factor

for rent and supplies overhead and for general and administrative expense could also be added to obtain the total estimated cost per title. In this study, however, we shall not include these categories of overhead in the analysis (except for the estimated cost of volume storage).

LIMITATIONS OF THE ESTIMATES

There are obvious limits to the confidence that can be placed in the estimates in Table III-A. They are a patchwork synthesis of various reports on serials control, none of which used precisely the same task definitions or measures of costs. What is needed is exactly what could not be found in the literature: namely, a task-by-task time analysis of serials control, both manual and automated, including all work performed in all departments in support of serials maintenance. Several such studies would have to be conducted at a number of institutions to establish the range of efficiency for each task that exists. The Williams study[8] was one major reported attempt to make such an interinstitutional comparison. The critical weakness of that study was that it relied on supervisor and/or employee estimates of the time spent on tasks involving serials, even though employees frequently worked on both serial and non-serial items. The result was a considerable range in the FTE estimates for the same functions among the libraries studied. For example, library C estimated that 6.15% of total staff time spent on serials was devoted

to check-in procedures. The comparable estimate for library D was 19.32%. We would have to conclude (a) that library C was 3 times more efficient in its check-in procedures than library D, (b) had 3 times fewer items to check in, or (c) that the difference is due to the variations that arise when people are asked to make a verbal estimate of how much time they or others spend on specific tasks.

As we shall see below, there is some comparative support for the estimates used in Table III-A. Nevertheless, in the analyses reported in Section V, we shall examine the effects of there being a 50% error (favoring owning) in the estimated costs used in this study.

SUPPORTING EVIDENCE

There are grounds for some degree of confidence in the totals to be derived from Table III-A and Appendix A. For example, the UCLA Ed/Psych library estimates 2300-2400 hours are spent each year in maintaining its active serial collection.[9] By applying the values in Table III-A to the number of items received at the E/P library, the number of titles renewed and bound each year, and the estimated number of claims each year, we derive an estimate of 2600 hours per year for maintenance (exclusive of binding and storage costs). The difference between the two estimates is close to the 10% margin of tolerable error (see Table III-B).

The estimate of 1.8 hours of total labor per year for

the average title (see above) also compares reasonably well with estimates of 2.0 hours derived from data obtained at a large Midwestern university on the total FTE required to maintain all serials currently received.[10] (See Table III-B.) It is interesting to note also that Fayollat[11] reported data on the number of personnel involved in an automated batch system for serials maintenance and the total labor per serial amounted to 1.7 hours (see Table III-B). Verity,[12] however, estimated 1.14 hours total labor per serial for 3500 active titles at the Lawrence Radiation Lab, a figure that is uncomfortably lower than the figure used in this research.

The values assumed in Table III-A lead to an estimate for total processing costs (exclusive of subscription, binding and storage) of approximately $8.00 per year for an average periodical of 5 annual issues (see Appendix A). This figure compares reasonably well with data reported by Grosch[13] on the costs of maintenance at the University of Minnesota Medical Library. The estimate made there can be adjusted to approximately $7.20 in 1976 dollars (see Table III-B).

SUMMARY

Despite such apparent support for the values assumed in this study, it is evident to this researcher that the costs of maintaining a serial, especially the labor costs, are far from clearly determined. The definitive comparative analysis remains to be done. In its absence, though, and

mindful of the press of events on managers who must make decisions today, we shall use the values in Table III-A for this report. Those estimates yield a total average annual cost in 1976 dollars for the maintenance of a periodical (exclusive of its subscription cost) of $15.00 (see Appendix A). As noted above, this figure does not include overhead expense for rent and supplies and general and administrative expenses. If we assume a factor of 30% of total salaries for these items, the cost of maintenance would be $20.00 per year.[14]

References and Notes

1. Richard P. Palmer, Case Studies in Library Computer Systems, (New York: Bowker, 1973).

2. Audrey Grosch, "University of Minnesota Bio-Medical Library Serials System," Special Libraries, 60 (1969), 349-360.

3. James Fayollat, "On-Line Serials Control System in a Large Biomedical Library," Journal of American Society for Information Science, 24 (1973), 80-86.

4. John B. Verity and Elizabeth L. Crocker, "A Computer-Based System for Serial Records at Lawrence Radiation Laboratory," Journal of American Society of Information Science, 21 (1970), 247-253.

5. Michael Koenig, "SCOPE: A Cost Analysis of an Automated Serials Record System," Journal of Library Automation, 4 (1971), 129-140.

6. Gordon Williams, et al., Library Cost Models: Owning Versus Borrowing Serial Publications, (Washington, D.C.: Office of Science Information, National Science Foundation, 1968).

7. Robert M. Hayes and Joseph Becker, Handbook for Data Processing for Libraries, (Los Angeles: Melville, 1974), Chapter 4.

8. Gordon Williams, op. cit.

9. The UCLA Education/Psychology Library shall be referred to in this paper as the UCLA Ed/Psych or the UCLA E/P library.

10. Personal communication.

11. James Fayollat, op. cit.

12. John B. Verity, op. cit.

13. Audrey Grosch, op. cit.

14. Because methods for computing overhead vary among institutions, we shall not include this cost element in the calculations used here.

IV

ISSUES IN ESTIMATING AND PREDICTING TOTAL USE

BASIC ASSUMPTIONS

Having estimated the cost of borrowing and the costs of owning a periodical, we now consider some of the issues involved in acquiring the last block of information required to determine whether borrowing or owning is the more economical alternative: the use of a periodical. Normally, use studies rely on some observable evidence such as a charge out card, a due date stamped in the back of a volume, or the reshelving of a volume as evidence that a volume has been "used." The limitations of these measures have been noted frequently. For example:

- Was the volume read in depth or was the table of contents merely scanned?

- Was the material that was read found to be of great value to the user or did it prove only peripherally related to his need?

- Was the volume read for two weeks or only for one day?

- Were more than one article per volume consulted?

- How many per volume uses are missed because of reshelving by patrons?

- How many uses are foregone because the volume was off the shelf?

Despite these limitations, the fact remains that the current methods of collecting use data are the only viable economic means by which most libraries can hope to collect information on the use of their collections. There is a basic research question here that involves two elements:

1. The number of uses of a volume as measured (or measurable economically) by current library methods.

2. The number of uses of a volume that can be met only by the examination of the volume itself. Some demands could be met by reference to abstracts or literature reviews and hence do not require ownership of the volume.

The research issue involves the relationship of these two elements. If a volume is counted by the library as used X times because it was reshelved X times, what percentage of those uses actually require the physical examination of the volume? Such studies would allow libraries to project total significant demand from measured use based upon whatever mathematical relationships are shown to exist. This would allow libraries to continue to collect use statistics in a relatively inexpensive way and yet have greater confidence in their final calculations of use.

In the absence of such refining analysis, however, the investigation reported in this paper will have to assume that total use requiring the examination of the volume itself can be measured reasonably accurately by current methods: observing volumes reshelved, counting circulation cards, or noting return

dates stamped in the back of the book. We thus assume that those uses that result in the reshelving of a volume but which could have been met by other means (e.g., consulting abstracts or reviews) are balanced by those uses that go unrecorded because a patron reshelves the book himself or consults more than one article in the volume.

ESTIMATING TOTAL DEMAND AS A FUNCTION OF CIRCULATION

One substudy did have to be conducted during the course of this research, however, because it was possible to obtain data on the circulated uses but not the in-house uses of the commonly held periodicals at Santa Barbara, Riverside, and San Diego. It thus was necessary to carry out a smaller project designed to estimate the in-house use of a periodical on the basis of its circulated use. The results of that study are reported in Section V below. This was a useful exercise, because, if the factors derived from that study can be validated, we shall have greater confidence in being able to project total demand on the basis of circulation alone.

Based on other research,[1] it was hypothesized before undertaking this research that the ratio of circulation to in-house uses would be in the vicinity of 1:3. No range of confidence was established beforehand, however.

PREDICTING FUTURE DEMAND

We must note that the most fundamental assumption underlying the research reported here is that the future

demand of a periodical title can be predicted on the basis of previous use of that title. This assumption rests on two further assumptions: (1) that the future use of a volume can be predicted on the basis of the previous use of that volume and (2) that the individual volumes of a periodical are sufficiently related to each other with respect to content, level of treatment and user groups appeal, that it is possible to project the use of future volumes of a given periodical on the basis of use of existing volumes.

Again, we must acknowledge that these are assumptions requiring further basic research in order for the science of collection management to become more sophisticated. Line and Sandison[2] have questioned whether future use can indeed be reliably predicted on the basis of past use. They note the level of use of a title is subject to external factors such as the growth rate of the collection, changes in the size or nature in the user population, etc., and to internal factors such as changes in editorial policy, quality of the contributions, etc.

There have been, however, several valid studies by Fussler and Simon,[3] Trueswell,[4] Jain,[5] and Middleswort[6] which have found evidence supporting or documenting the relationship between post use and current use of a volume. Fussler and Simon[7] have also provided evidence to support what they refer to as the "family quality" of serials, i.e., an underlying commonality in the level of use of the parts of a serial.

The weight of the evidence available in these studies favors the assumption that future use of a periodical title can be predicted with some degree of confidence. It is on this assumption that a manager would have to make the own-versus-borrow decision, and it is on this assumption that this investigation has proceeded. Only additional research can determine the confidence of that assumption.

References and Notes

1. Personal communication from Robert M. Hayes, UCLA School of Library and Information Science.

2. Maurice B. Line and Alexander Sandison, "Progress in Documentation. 'Obsolescence' and Changes in the Use of Literature with Time," J. Doc. 30 (1974), 285-350.

3. Herman Fussler and Julian Simon, Patterns in the Use of Books in Large Research Libraries, (Chicago: University of Chicago Press, 1969).

4. R. W. Trueswell, "Determining the Optimal Number of Volumes for a Library's Core Collection," LIBRI, 16 (1966), 49-60.

   ----------, "User Circulation Satisfaction Versus Size of Holdings at Three Academic Libraries," College and Research Libraries, 30 (1969), 204-213.

5. A. K. Jain, "Sampling and Short-Period Usage in the Purdue Library," College and Research Libraries, 27 (1966), 211-218.

   ----------, A Statistical Study of Book Use, (Lafayette, Indiana: Purdue University, 1967).

   ----------, "Sampling and Data Collection Methods for a Book-Use Study," Library Quarterly, 39 (1969), 245-252.

6. L. E. Middleswort, A Study of Book Use in the University of Chicago Library, unpublished M.S. thesis, (Chicago: University of Chicago, Graduate Library School, 1951).

7. Herman Fussler, op. cit.

V

RESULTS OF THE STUDY

THE STUDY POPULATION

Because of the work of Fussler and Simon who found variations in the level of use of books and serials among different disciplines, it was decided to restrict this investigation to periodicals related to the field of education, a discipline with which the author had some familiarity.

The study population was further restricted to those titles that were:

(1) received at least twice a year

(2) in English

(3) received since 1970 and currently received (thus allowing 5 years of use data)

(4) related to education, determined:

(a) operationally by its being in the "L" class (at UCLA)

(b) subjectively by the author on the basis of title and/or content, e.g., Arithmetic Teacher, American Biology Teacher, etc.

Excluded from the study population were periodicals that were:

(1) government publications

(2) reference works

(3) loose leaf updates

(4) predominantly newsletters

(5) received bound

(6) microforms.

Titles were identified by examination of the serials holdings file at the UCLA Ed/Psych library.[1] A total of 302 titles met the criteria listed above. These titles were then checked against the 1973 edition of the University of California Union List of Serials (UCULS)[2] to determine which were held by each of the other southern campuses. Of the 302 titles, 17 or 5.6% could not be located in the UCULS and were excluded from the study population (302-17=285). In addition, the UCLA Ed/Psych library was not listed as a holder of 12 of the titles (4%). If this 4% error rate is applicable to the other campuses, it is possible that this study has under-represented overlap in holdings by that percentage. The only way to have determined that error rate for each campus, however, would have been to check each of the 302 titles against the current holdings list at each library. That would have required considerably more time at each of the local libraries, and because round trips to each campus were made in one day, time was at a premium. It was therefore decided that the error rate was tolerable, particularly because this study was more concerned with acquiring information on the level of use than on the exact degree of overlap.

Of the 285 periodicals remaining in the study group,

86 (30%) were owned, according to the UCULS, only by UCLA, among the southern campuses. Also, according to the UCULS, Santa Barbara owned 162 of the 285, Riverside owned 153, Irvine owned 90, and San Diego owned 79. It was not possible, however, to obtain circulation data for each of these titles at each of the campus libraries. Upon inspection of the actual volumes at Santa Barbara, Riverside, and San Diego, several additional titles had to be dropped from each library's list for the following reasons:

(1) no longer received (listed as held but no longer received)

(2) could not be located (reference help was not sought on these because of the time constraints for data collection)

(3) too many volumes were missing from the '70-'74 volumes (more than 2) for a reasonable circulation count

(4) still received but circulation data not available (e.g., not bound, not kept past 2 years, etc.)

(5) kept on reserve

The major loss to the study was the group of periodicals received at Irvine, which does not allow serials to circulate. Detailed data on the actual holdings at Irvine were therefore not obtained. Later we shall consider ways of projecting estimates for Irvine.

DEGREE OF OVERLAP

Tables V-A, B, C, and D summarize the holdings and problem cases for the four campuses. For the remainder of

this study we shall be concerned only with those titles for which circulation data could be obtained. The resulting percentages of overlap with UCLA for this group of periodicals are as follows:

School	Number of Titles	Percentage of Overlap with UCLA
Santa Barbara	144	51
Riverside	126	44
San Diego	61	21
Irvine (estimated only)	71	25

This results in a final study group of 331 subscriptions (excluding Irvine) currently received, all duplicate subscriptions to titles received at UCLA. In the results section that follows, we shall be estimating the percentage of these subscriptions that could be more economically borrowed.

These 331 subscriptions represent only 177 unique titles. To summarize:

1. Of the 285 titles in the study group defined as received at UCLA and listed in the UCULS
   A. 86 (30%) were received by UCLA alone
   B. 177 (62%)
      1) were confirmed by observation to be received by Santa Barbara, and/or Riverside, and/or

San Diego,

AND

2) had circulation data available

C. 22 (8%) failed to satisfy criterion B.1 or B.2 above

2. If Irvine were included, the study group of 331 subscriptions to the commonly held titles would be estimated at 402.

MEASURING CIRCULATION

For each title, the circulation slips in the back of each volume for the years 1970, 1971, 1972, 1973, and 1974 were examined. (For those bound on a fiscal year basis the 69/70 volume was counted as the 1970 volume, etc..) For each volume, the total number of circulations through the end of 1975 were recorded. (For Santa Barbara, whose due date stamp does not include the year, 2/3 of the periodicals were examined on one day during winter recess in January 1976. The remaining 1/3 of the Santa Barbara titles were examined in February 1976. It is thus possible that circulation counts for these 48 titles could be slightly higher than they would have been had they been examined with the other 2/3. The difference is considered to be insignificant for this study.)

A circulation was counted for a volume each time a due date was stamped and cancelled. Uncancelled due dates

(considered errors or renewals) and return stamps with no corresponding due date (considered errors) were not counted as a circulation. A circulation was counted for any recorded due date and cancellation regardless of special time period (e.g., some stamps showed longer dates for faculty) or type of use (e.g., ILL) except that reserve book room uses were not counted. (Titles that became part of the reserve collection were eliminated from the study group; clearly these titles would not be eligible for shared acquisitions.) Only a few volumes had been used so frequently that an earlier circulation slip had been torn out and replaced. These volumes were treated as missing observations (see Appendix B).

When only one or two volumes from the 1970-74 sequence were missing, two techniques were used for estimating total circulation for all five volumes through 1975. The technique yielding the higher estimate of circulation for each title was used. (Whenever alternative assumptions are possible, the procedure in this research will be to select the assumption that favors owning, the rationale being that those who propose a new approach to a problem must be able to show its advantages even when all questionable assumptions go against them.) See Appendix B for an explanation of the procedures for dealing with missing volumes. Whenever more than two volumes were missing, the title was eliminated from that campus' list.

Because the focus of this study is the relationship between cost and use, we shall delay a discussion of the circulation data until data on cost and use can be reported together.

PROJECTING TOTAL USE FROM CIRCULATION

Having counted (or in some cases estimated) total circulation for the '70-'74 volumes for each title at each campus, we are faced with the problem of estimating the total use of those volumes. Total use is assumed to equal circulation plus in-house use. Total in-house use is assumed to vary directly with total circulation. To estimate this relationship a substudy was conducted at UCLA.

1. The Subsample

Of the 177 study group titles for which circulation data could be obtained, 134 (76%) were in the 'L' class. This group of 134 was selected as a special subgroup for the analysis of in-house use versus circulation use. The decision to restrict the subsample to those in the 'L' class was strictly for convenience. It made the recording of volumes reshelved far simpler, as will be seen in the procedure section below. It was assumed that the remaining 1/4 of the titles were similar enough to the subsample in terms of language, content, and length of receipt that the results would hold for them as well.

2. Procedure

For a six-month period (Jan.-June 1976), every 'L' class volume used in-house and reshelved at the UCLA Ed/Psych library was recorded. It was possible to focus exclusively on those volumes used in-house because procedures at the Ed/Psych library cause volumes used in-house to be collected and sorted separately from those that have circulated. Volumes were collected and sorted twice a day (once in the A.M., once in the P.M.), but reshelved only once a day, some time after the A.M. pickup. By examining all volumes collected and sorted just after the A.M. pickup, it was possible to record all volumes that had been used in-house since the previous day's reshelving. (Weekend items were picked up on Saturday and Sunday but not reshelved until Monday.)

The basic recording procedure was to write down the call number of every '70-'74 volume in the 'L' class (most, but not all of which were in the subsample). These records were later posted to the list of titles in the subsample. (Although this two-step procedure required somewhat more time in toto to complete than would have been required by the direct posting to the list of titles as each volume was observed on the sorting truck, it allowed the investigator to spend less time in the sorting area and therefore to get out of the way of the busy circulation staff.)

It was not possible for the author to be present every morning during the six-month period to record titles prior to reshelving. The following procedure was used to estimate a title's total in-house use on the basis of its observed in-house use. The total and the daily number of bound volumes (monos and serials) reshelved at the Ed/Psych library during the six-month period was obtained. The daily reshelving was then divided by total reshelving to estimate the percentage of volumes used and reshelved on each day. For those days on which the author was present to record reshelved titles, the daily percentages of total reshelving were identified and summed. It was determined that the author had recorded titles on days which accounted for a total of 62.8% of the total volumes reshelved during the six-month period. Each title's observed in-house use was then divided by .628 to estimate its total in-house use during that six-month period. Zero observed in-house uses were assumed to remain zero for the total period. For this calculation to be considered valid we must assume that the ratio of volumes in the substudy to all volumes reshelved remained relatively constant each day.

Next, on July 1, the author examined every '70-'74 volume of each subsample title to determine its total circulation during the six-month period. If volumes were missing, the average circulations of those volumes present was multiplied by 5.

These procedures yield an estimate of total in-house use for the '70-'74 volumes of each title for the six-month study period, plus an estimate of total number of circulations for the same volumes and titles for the same period. We next compute the average number of in-house uses for each level of circulation.

3. Results

Table V-F shows the average number of in-house uses (column 3) for each level of circulation (column 1). It also shows the total number of titles in each circulation category (column 2). Thus, 36 titles had 0 circulations and their average number of in-house uses was 1.5. Similarly, 19 titles had 1 circulation and an average of 4.7 in-house uses. The total number of in-house uses for all titles (2114) divided by the total number of circulations for all titles (602) yields an average number of in-house uses per circulation of 3.5.

In this study we shall make estimates of total use of a title based upon the assumption of 3.5 in-house uses for each circulation. Column 5 in Table V-F employs that assumption and shows the predicted total number of uses for each level of circulation. The 3.5 assumption yields a reasonable approximation of observed total use as shown in column 4 for each level of circulation except 0, 2, and 3. We shall consider two possible

explanations of these anomalies.

A. Chance Effect

We might assume that the chance variations have led to these results for titles with low circulation (4). Thus if we compared total in-house uses with total circulation for all titles with less than 4 circulations (239 - 61), we would find an average of 3.9 in-house uses per recorded circulation, a figure which is just over 10% higher than the 3.5 average. This explanation supports the notion that 3.5 is a reasonable assumption overall.

B. Low Circulation/Hi Use Condition

Alternatively we might assume that certain titles have particular characteristics that lead to high in-house use but low circulated use. Intuitively, this seems logical for certain titles whose weight or bulk make them awkward to tote around. Other possible titles in this category might be works in which news items predominate rather than scholarly material or titles which are primarily reference sources.

We note that over 33% of the titles having total circulated uses of 2 or 3 had ratios of in-house per circulation that were double the average for the entire sample. The highest comparable percentage for any other level of circulation was 14%.

Thus the higher than average in-house use of titles having circulation of 2 or 3 is caused primarily by an identifiable sub-group of titles that have an unexpectedly high level of total use rather than by all titles in those circulation groups having somewhat higher than average in-house use. This supports the hypothesis that there is an identifiable group of high use/low circulation titles that can cause problems in predicting total use based upon circulation. This would lead to two problems in planning a shared resources network.

1) Certain low circulation/high in-house titles would probably be more costly to share than own, but would appear as likely candidates for sharing based on circulation data alone.

2) The means would need to be devised to identify these titles (research to identify the likely types, user polls to identify such titles, etc.), so they can be safely omitted from the list of candidates for the shared pool. Clearly, it would be unwise to cancel any periodical subscription on the basis of circulation alone. Some procedures would need to be instituted to insure

adequate review by librarians and feedback and comment from users.

We conclude from this substudy that:

1. 3.5 in-house uses per circulation is a reasonable estimate for the current investigation. In order to estimate total demand using the 3.5 factor, we multiply circulation by 4.5.
2. Research is needed to help verify the existence of titles that are low circulation but high use and examine their characteristics.

A final and very important assumption made here is that the results of the circulation: in-house use study conducted at UCLA is applicable to the other campuses despite different loan periods for serials (2 days at UCLA, 1 day UCSB and UCSD, 7 days at UCR). We have no way to confirm or deny this assumption and again acknowledge the need for an additional substudy. The primary danger of this assumption from a management point of view is the possibility of underestimating total use at SB and SD. This effect would occur if the shorter loan periods for serials for those two libraries tended to suppress circulation and inflate in-house use. In the results section of this report we shall include an analysis based on the assumption that total demand has been underestimated by 50%.

PROJECTING TOTAL FUTURE DEMAND FOR THE STUDY GROUP

In this investigation we shall attempt to estimate total

future demand for the study group titles for the next ten years. Then, by comparing the cost per use if borrowed with the cost per use if owned, we can determine the more cost effective alternative for each title at each library.

As noted in Section IV above, the validity of predicting future demand for a periodical on the basis of past use is the single most important assumption underlying this investigation. Until further research contradicts the studies cited in IV, we shall assume a sufficient degree of confidence in that assumption to proceed with the analysis.

We shall limit ourselves to a ten-year period in this study because of the uncertainties of projecting unit costs for owning or borrowing beyond that time, and because of the problems in estimating the decay in use over time of a given volume. We shall, in effect, ignore possible changes over time in this analysis by assuming a constant ratio of the costs of borrowing to the costs of owning, and by assuming no decline in volume use over the ten-year period. These assumptions are obviously limiting, but their resolution is beyond the scope of this pilot analysis.

The assumptions and analysis used in projecting circulation demand for ten years are described in detail in Appendix C. That analysis yields an estimated factor of 3.67 by which total circulation for the 1970-1974 volumes of each title should be multiplied in order to predict total future circulation of the volumes of each title to be received in

the next ten years. (Note that we are not predicting the future demand for the '70-'74 volumes themselves. These volumes, and any other volumes already owned, are not of concern to this study because they are not being treated as candidates for a shared pool of resources.) By combining the factor for predicting circulation of the volumes received in the next ten years, with the factor developed for estimating total demand based upon circulation (4.5), we derive a factor of 16.5 (3.67 x 4.5) for predicting total demand for the volumes received in the next ten years. Thus, for example, if the 1970-1974 volumes of a title received at Santa Barbara had a total circulation of 5, we would predict 82.5 total uses (5 x 16.5 = 82.5) of the volumes to be received during 1975-1984.

ESTIMATES OF THE PERCENTAGE OF TITLES MORE ECONOMICALLY BORROWED THAN OWNED

We have now acquired all the major blocks of information necessary to consider the following questions:

1. At what level of total demand for a given cost of owning is it as economical to borrow as to own?

2. What percentage of the total number of subscriptions to commonly held periodicals (N=331) have a projected total demand and cost of owning which favor borrowing rather than owning?

We shall use the data on the cost of borrowing (Section II), the cost of owning (Section III and Appendix A), and the projection of total demand for each title at each library for

the next ten years (Section V) to answer these questions at two levels of detail.

First, at a general level, we may use the average annual cost of owning a periodical in order to estimate the level of total demand at which borrowing and owning become economically equal, i.e., the choice is indifferent. This approach can be used when we know the average cost of owning serials in a particular field (as reported, for example, in the Bowker Annual), and we want to estimate the percentage of titles eligible for sharing based on the known distribution of their circulation levels. As noted in Appendix A, the average annual cost of owning the periodicals examined in this study is $30.00.

Table V-F shows for each level of total circulation of the '70-'74 volumes (column 1) the total estimated demand for the volumes to be received in the next ten years (column 2), the cumulative percentage of titles having that level of demand for UCSB (column 3), UCR (column 4), UCSD (column 5), and the total study group (column 6). Because column (1) is the basic independent variable and is the actual observed (or estimated) number of circulations of the '70-'74 volumes at each library, the reader is free to apply alternative assumptions to devise estimates of total demand at which the choice is indifferent.

The indifference point with respect to ten-year total demand may be identified as follows:

(1) $10 \times CoO = \$CoB \times TD$

where

CoO = cost of owning ($30)

CoB = cost of borrowing ($3)

TD = total demand for vols rec'd in next 10 years

hence

$10 \times \$30 = \$3 \times TD$

$TD = 100$

Referring to Table V-F, we find that 51% of all subscriptions to the commonly held periodicals (column 6) fall below 100 total demands (column 2) and hence would be more economically owned than borrowed. For individual schools, we find that this represents 51% of the Santa Barbara subscriptions (column 3), 37% of the Riverside subscriptions (column 4), and 84% of the San Diego subscriptions (column 5). The 100 total uses over ten years amounts to an annual demand of ten per year. It is interesting to note that Williams[3] found a similar breakeven point (just under ten) for a ten-year time period.

We can also explore the results of altering assumed values in the above equation. For example, suppose the cost of maintaining a serial (exclusive of the subscription cost) developed in Section III and Appendix A is actually 50% too high. This would result in an average cost of owning of $22.50 vice $30 and a new indifference point ($30 - ½ (15) = 22.50). Substituting in equation (1) above we find

(2) $10 \times \$22.50 = \$3 \times TD$

$TD = 75$

This reduces the percentage of subscriptions more economically shared to 45% of the total with concomitant reductions at each school.

Next let us assume the lower cost of owning (22.50) and a higher cost per loan (50% or $4.50). Substituting in equation (1) we have

(3) $10 \times \$22.50 = 4.5 \times TD$

$TD = 50$

This has reduced the total percentage below the indifference point of demand to 39%.

Next, assume the lower cost of owning ($22.50), higher cost per loan ($4.50) and an underestimation of demand by 50%. By trial and error we find the new indifference point of demand to be 33.3 which would account for 35% of the total subscriptions.

In summary, we may conclude that by taking the derived values for owning, borrowing and level of demand as valid, an estimated 51% of the subscriptions to the commonly held titles in this study group could be more economically borrowed than owned. If we assume 50% error rates (favoring owning) in the three key derived values (cost of processing, cost of borrowing, projected demand for ten years), this percentage drops to 35%.

Finally, it is interesting to examine what we might term an "acid test of savings." Assume the cost of loans

at $3.00 is valid and the projections of demand are accurate, but that the cost of owning should consist only of the direct costs paid by the university for services other than employee labor. In effect, these represent savings we would realize immediately if we kept the same number of employees but eliminated all other direct costs. For this analysis these direct costs consist of the subscription cost (avg. = $15.00) and the binding cost (avg. = $6.70). Substituting in equation (1) we have

$$10\ (21.70) = 3 \times TD$$

$$TD = 72$$

This yields an estimate of 45% of the total subscriptions.

The more precise level of analysis, however, would not use the average cost of all titles but would compute the average cost per use for each individual title and compare it with the average cost per loan. This approach would have to be used in order to identify the names of the specific titles that are more economically borrowed. It is expected that this approach would yield a smaller percentage of "shareable' titles than did the analysis using average cost, because certain works, while used relatively infrequently, are so inexpensive that their cost per use is still lower than the cost per loan. A portion of this attrition should be balanced by a few titles whose relatively high use is countered by a cost of owning high enough to make it more economical to borrow those titles.

To make this more precise estimate, we must identify the cost of owning which fixes the indifference point for each level of total demand. The procedures for this analysis are described in Appendix D.

The results derived under each of the set of assumptions considered earlier are only slightly lower than those found using the general average of $30 (see Table V-G). Assuming the cost per loan = $3.00, and that the estimates of the cost of owning and of total demand are accurate as originally computed, we find that 48% of all subscriptions are far more economically borrowed, i.e., their cost per use when owned for ten years is higher than their cost per borrowing. (This is only 3 percentage points lower than the 51% found using the same assumptions and the $30 average.) Similarly, using the suggested acid test of savings which assumes costs equal only to direct expenses for subscriptions and binding, we find 42% of the total subscriptions are for titles which are more economically borrowed. (This compares with the 45% found using the average figure of $15 per subscription.)

Finally, considering the worst conditions assumed previously (50% error in projecting total demand, cost per loan and cost of processing), 10% of the total subscriptions are for titles still eligible for shared acquisitions (compares with 35% using the average cost).

ESTIMATING IRVINE

As noted in Table V-D, Irvine would have added an estimated 71 to the total number of subscriptions to commonly held periodicals. We could assume three effects on the previous analysis had circulation data from Irvine been available.

1. No change in final percentages. We could assume a new total pool of 402 subscriptions but no change in the range of estimates of the percentage of subscriptions below the indifference point (31-51%).

2. Lower final percentages. This would have resulted if Irvine's use per title was greater than the average for UCSB, UCR, and UCSD. Let us assume that Irvine had even fewer periodicals in the low use group than Riverside, which clearly had the most intensive use per title among the other three. Recall that equation (1) yielded an estimate of 51% below the indifferent point for the total pool, with the Riverside percentage at 37%. If we assume that Irivne had only 20% of its titles below that indifference point, equation (1) would have yielded an estimate of 46% vice 51%, a reduction of 10%. If we assumed all other estimates made as we varied assumptions are also reduced by 10%, the range would have been 27% to 46% of the total pool eligible for sharing.

3. Higher final percentages. If we assumed 10% higher final estimates instead, the range would have been 34-56%.

DISCUSSION OF THE RESULTS

The magnitude of the percentages reported in the results section were quite unexpected to this researcher. Even when we assume a 50% error favoring owning in the estimate for the cost per loan, cost of processing, and ten-year total demand per title, nearly one-third of the commonly held periodicals would be more economically borrowed from a regional center such as UCLA. As we assume greater confidence in the estimate used in this investigation for costs and demand, that fraction approaches one-half.

This finding is consistent, however, with the conclusion reached by Williams using survey data from several large libraries. "The available evidence from other studies indicates that a large proportion--perhaps half or more--of the serials titles now currently received in large research libraries are used less frequently than [the break-even point for borrowing versus owning]."[4]

The most important conclusion of this investigation is that there appears to be considerable potential among southern campuses for elimination of duplicate subscriptions to periodicals related to the field of education. In this study we will not attempt to estimate the potential savings in dollars from a shared acquisitions program. Such an exercise would have forced us to place even greater confidence in the precision of our estimates than they deserve. Besides, it is likely that such savings would become signifi-

cant only when a much larger pool of overlapping subscriptions could be eliminated.

Given the magnitude of estimates found in this study for reducing periodicals subscriptions, and the concomitant effect such reductions would have on the nature of libraries and library services in a southern UC network, it is important to reiterate the limitations of this study.

First, it focused on specific volumes of a narrowly defined type of serial in one language, related primarily to one discipline. It also was restricted to an analysis of use over a ten-year period only.

Second, it relied on several critical assumptions, the most important of which were:

- that future demand for a periodical could be predicted on the basis of past use
- that use is a satisfactory criterion for judging the value of owning a title.

Third, it relied on a number of important derived values including:

- the estimated relation between circulation and in-house use
- the cost of owning a periodical
- the cost of borrowing a periodical
- future demand for ten years.

It also identified several areas requiring further basic research. These included:

- the problem of estimating decline in use over time

- the effect of length of loan period on circulation, in-house use and total demand

- more precise analyses of the costs of owning and borrowing

- the problem of identifying high use, low circulation titles.

In addition, there are certain questions that require a crystal ball, a management decision, or both. These include:

- the effects of future inflation on subscription and labor costs

- developments in automation and microform technology

- determination and allocation by function of the costs of union catalogs

- determination and allocation of the costs of communication of requests and material among libraries

- the feasibility of the failsafe features of the proposed loan system, whereby titles that are cancelled but actually have a demand level that justifies owning could be identified and reacquired within a reasonable time period.

The results reported in this study must be understood in the context of all of these limitations, assumptions and issues needing further research. It also stands in need of one of the prime scientific tests: replication. To date, it is the only study conducted since the California State

Auditors Report to conclude that there is, in fact, great potential for a system of shared acquisitions in a UC regional network. Until shown otherwise, however, that is the primary conclusion of this research.

THE NEED FOR BETTER MANAGEMENT INFORMATION SYSTEMS IN LIBRARIES

During the course of this research it became evident to the investigator that we currently have very inadequate procedures for monitoring the use of our collections. We obtain only the most general statistics on reshelving and circulation, none of which is sufficient to allow us to understand patterns of use for specific kinds of material related to specific disciplines. Yet this is precisely the kind of information that is required if we are to make intelligent decisions about the merits of owning and borrowing, the value of networks, etc. We have, in effect, an enterprise that has only the most rudimentary ideas about how its products and services are utilized, an institution devoted to knowledge but which has painfully little information about how effectively its own multi-million dollar budgets are spent.

Yet the means for improving our management information systems are (or so it seems to this investigator) feasible and relatively inexpensive. If we use appropriate sampling techniques and systematically focus our efforts on specific

disciplines and specific kinds of material, we can obtain valuable feedback on our collection decisions. During this research, for example, the author was able to record the total circulation for the 1970-1974 volumes (once call numbers were obtained) at the rate of 25 titles per hour. At this rate of direct labor, data on nearly a thousand titles could be collected in .02 man years for direct labor, .03 man years for total labor (direct and indirect), or in about a week and a half by one FTE. During the circulation: in-house use study, when only 1976 circulations were being counted in 5 volumes, the rate jumped to 50 titles per hour. With some simple (but not inefficient) work flow changes, data on the use of volumes used in-house could also be obtained by the circulation staff just after each truck was sorted and just before it was reshelved. Titles being studied could be color tagged and counted very quickly for investigations that were focusing on the relation of the total circulation to total in-house use. Such studies could be supported and refined by smaller, more labor-intensive investigations that sought to examine the circulation: in-house relationship for specific titles.

In sum, it appears to this author that the means are at hand to significantly upgrade our management information systems related to our collections if the need to do so is acknowledged.

References and Notes

1. We shall refer to the UCLA Education/Psychology library as the UCLA Ed/Psych or UCLA E/P library.

2. California. University. University-Wide Library Automation Program, University of California Union List of Serials, (Berkeley, 1973).

   All references to the UCULS in this paper will be to the 1973 edition. The 1976 edition was received after this paper was in draft form.

3. Gordon Williams, et al., Library Cost Models: Owning Versus Borwowing Serial Publications, (Washington, D.C.: Office of Science Information, National Science Foundation, 1968), p. 38.

4. Ibid., p. 1.

TABLES

TABLE II-A

COSTS OF LENDING

Task or Cost	Estimated Cost
1. Identify item and fill out request form	0
2. Scan request form for accuracy and completeness	.22
3. Communicate request	.23
4. Handling of item at lending library	1.36
Includes	
- receive	
- sort	
- retrieve	
- copy labor	
- mail	
- reshelving	
5. Delivery of item to patron	.39
6. Copy costs (material only)	.35
7. Copyright costs	.20
8. Record keeping	.25
	3.00

Sources Used in Developing

Table II-A

Source	Referred to in notes as:
1. Robert Hayes, Final Report on a Study of a System for Interlibrary Communication (SILC), (Los Angeles: Becker and Hayes, Inc, 1973.)	SILC
2. Vernon Palmour, Marcia Bellassai, and Lucy Gray, Access to Periodical Resources; a National Plan, (Rockville, Md.: Association of Research Libraries, 1974.)	Palmour
3. A Study of the Characteristics, Costs and Magnitude of Interlibrary Loans in Academic Libraries, Vernon E. Palmour, Edward C. Bryant, Nancy Caldwell and Lucy M. Gray, compilers, (Westport, Conn.: Greenwood, 1972.)	Westat
4. Personal communication to the author from the Pacific Southwest Regional Medical Library, UCLA Biomedical Library	UCLA Bio-med

for proration (e.g., unit, weight, volume, other.) Because the mail costs are known, we shall use those as the basis for making an estimate that is at least firm.

4. Handling at lending library

The Westat study as revised by Hayes in SILC indicated costs of handling at 1.82 per item for filled copy in 1976 dollars. The UCLA Bio-med ILL services estimates handling at $1.36. The difference is assumed to be attributable to the fact that the UCLA Bio-med is organized to provide efficient, high speed, high volume turnaround and is specifically designed for the ILL purpose. The libraries studied by Westat had a lower volume and presumably a somewhat less efficient operation. We shall use the UCLA estimate because its efficiency and design are exactly what would be required in order to reduce loan costs.

5. Delivery of item to patron

Assume 3 oz. per item (Palmour) @ 13¢/oz. Again, this assumes mail vice truck, using the same rationale as (1) above.

6. Copy costs

Westat found an average of 10 pages per request. At 3.5¢ per page (Palmour), total is 35¢/request.

Notes for Table 11-A (cont'd)

7. Copyright costs

We shall assume that the law will continue to permit photocopies to be made for academic research purposes, but that a page fee will be required as reimbursement to the publisher. We shall arbitrarily assume 2¢ per page.

8. Record keeping

UCLA's record keeping costs (computerized) are approximately 17¢ per filled copy. Hayes computed the Westat data at approximately 84¢ for record keeping and accounting (recovering copy costs from the borrowing library.) The very simple record keeping outlined in the potential loan system described suggests costs should be low. We shall estimate 25¢ per request.

Table III-A

ESTIMATED COST OF MAINTAINING A PERIODICAL SUBSCRIPTION:

THE RECURRENT ANNUAL COSTS

Task or Function	Estimated Time or Cost
1. Receiving and recording Includes: physical receipt all record additions, corrections shelving first time	6.5 min per issue rec'd
2. Claiming	.75 min per issue rec'd
3. Renewal	15 min per title
4. Binding preparation Includes: all record preparation physical handling	20 min per title
5. Binding	$6.70 per title
6. Storage	$ .75 per volume

Sources Used in Developing

Table III-A

Source	Referred to in notes as:
1. California State University and Colleges, Library Development 1977/78-1981/82 (draft), (Long Beeach: 1976).	CSUC
2. Robert M. Hayes and Joseph, Handbook for Data Processing in Libraries, (Los Angeles: Melville, 1974), pp. 118-119.	Hayes
3. Ferdinand F. Leimkuhler and Michael D. Cooper, Cost Accounting and Analysis for University Libraries, (Berkeley: University of California, Office of the Vice President-Planning and Analysis, 1970).	Leimkuhler and Cooper
4. Personal communication from a UC campus library	Library A
5. Personal communication from a large mid western university library.	Library B
6. M.J. Voigt, "(Costs of Data Processing) in Serials Handling", College and Research Libraries, 24 (1963), 489-91.	San Diego
7. James Fayollat, "On line Serials Contol System in a Large Biomedical Library", Journal of American Society for Information Science, 24 (1973), 80-86.	UCLA Bio-med
8. Personal communication from head of bindery preparation section, UCLA Research Library	UCLA central records
9. Personal communication from UCLA Education/Psychology Library serials staff	UCLA E/P

Sources Used in Developing

Table III-A

Source	Referred to in notes as:
10. Gordon Williams, et al., Library Cost Models: Owning Versus Borrowing Serial Publications, (Washington, D.C.: Office of Science Information, National Science Foundation, 1968).	Williams

Notes for Table III-A

1. Receiving and recording

   A. CSUC

   5.2 min/vol receiving

   3.6 min/vol processing

   8.8 min/vol total

   Above assumed to include initial shelving. Also assumes time per book volume is applicable to time per issue of serial received, although this estimate is likely to be higher than would be the case for a single issue.

   B. Library A

   2870 minutes weekly average to receive, check in, update files, and record revisions. Assuming 5 issues per title for 4900 titles received yields:

$$\frac{4900 \times 5}{52} = 471 \text{ issues per week}$$

$$\frac{2870}{471} = 6.1 \text{ minutes per issue}$$

   C. Hayes

   Receiving estimated at .02 manyears per 1000 items

   Checking in estimated at .02 manyears per 1000 items

   Shelving estimated at .012 manyears per 1000 items (assume 1/3 of Hayes estimate because of smaller area occupied by unbound serials)

$$\frac{.052 \times 2000}{1000} \times 60 = 6.24 \text{ minutes per issue}$$

D. San Diego

Time and motion study estimated 1 minute per issue to do record keeping check in for a serial. Projecting this to cost accounting yields an estimate of 1.5 minutes per check in.

E. Discussion of receiving and recording

No single source has identified separately all activities involved in receiving, checking in, updating, and shelving. The estimates from Library A lack times for shelving and the Hayes estimates do not include times for revisions required by title changes, tec. The CSUC figures, on the other hand, are based on monographs handling and are probably too high an estimate for serials. For this study we shall use (somewhat arbitrarily) an estimate of 6.5 minutes per issue for all handling and record keeping tasks.

2. Claiming

This should be calculated as a percentage of issues received per title, i.e., the more issues received per title, the more likely one will have to submit a claim at some point for that title. Estimates are quite dispersed, however.

A. Library B estimates claims sent at the rate of 1 for every 28 items received.

B. UCLA Bio-med estimated claims sent at the rate of 1 for every 13 issues received.

C. UCLA E/P estimated claims at the rate of 1 for every 20 issues currently received.

D. CSUC estimated 30 minutes per claim sent.

E. UCLA Bio-med found 10-15 minutes per claim sent among libraries it surveyed that used a manual system.

F. Library A estimated time spent on claims was 6.7% of time spent on handling and record keeping.

G. Discussion of claiming. Considering A - C above, claims issues at the rate of 1 for every 20

items received would appear to be a reasonable estimate. If we assume 15 minutes per claim, the result is 15 minutes in claiming for every 20 issues received or

1 x 15 min = .75 min per issue received

3. Renewals

A. Hayes

Ordering estimated at .2 manyears/1000 items

(.2) (60) (2000) / 1000 = 24 min title

B. CSUC

Preparation of purchase order estimated at 15 minutes per title.

C. Discussion of renewals

Although contracting the services of a few dealers can reduce the time required to renew subscriptions, the current economic restraints are forcing many more titles to undergo some kind of review prior to renewal, thereby reducing the number of automatic renewals. An average of 20 minutes per renewal, (average of the Hayes and CSUC estimates) will be used here. We shall further assume that no more than 1/4 of the titles are renewed automatically through a few dealer contracts. Hence the average per title renewal time will be estimated at 15 minutes per title overall.

3. Binding preparation

A. CSUS

Estimates 18.3 minutes per volume

B. Hayes

Assume ½ time for invoice preparation and ½ time for handling serials. Hence

½ (.3 manyears) (60) (2000) / 1000 = 18 min / vol.

C. Discussion of binding preparation

Assume 18 minutes per title for preparation plus 2 minutes per volume for reshelving upon return of bound volume = 20 minutes per title.

5. Binding

UCLA central records indicate the following costs for binding:

$6.00 per volume for standard binding

$14.00 per volume for volumes requiring special handling

Assume that 5% of all volumes require special handling and that 5% of all titles require 2 volumes per year. Hence,

.052 ($6 x 2) + .05 ($14) + .9 ($6) = $ 6.73 per title

6. Storage

Leimkuhler and Cooper estimated costs of storage at UC Berkeley at $ 5.00 per square foot in 1970. Assuming 10 volumes per square foot, this is 50¢ per volume per year. This was admittedly a simplified estimate but a more precise estimate for UCLA and the other southern campuses would involve detailed study beyond the scope of this paper. The variables and values used in the Berkeley study are listed on page 16 of the report. For the purposes of this research, we shall simply update the 1976 present value and assume 10 volumes per square foot. The present value estimate at 6% inflation yields an estimate of 75¢ per volume per year.

TABLE III-B

SUPPORTING DATA FOR ESTIMATES OF

COST OF MAINTAINING A SUBSCRIPTION

1. UCLA E/P Library

A. Verbal estimates of staff time spent on maintenance

1) serials staff .5 FTE + .4 FTE	1800 hours
2) circulation staff	300 hours
3) supporting functions at URL, estimate at 10% of 1 + 2 above	210 hours
	2310 hours

B. Estimate using Table III-A values and known number of receipts, renewals, claims, bound volumes

1) receiving and recording 8000 x 6.5 x 1.5 / 60 =	1300 hours
2) claiming 8000 x .75 x 1.5 / 60 =	150 hours
3) renewals 500 x 15 x 1.5 / 60 =	188 hours
4) binding prep 2000 x 20 x 1.5 / 60 =	1000 hours
	2638 hours

2. Library B - A large mid western university library

Staffing/serials received:

1) 15 FTE assigned to receiving, recording, renewal, bindery prep	
2) 15,000 active serials received	
(2000 x 15)/15,000 =	2.0 hours per title

TABLE III-B (cont'd)

3. UCLA Biomed Library (automated system)

Staffing/serials received:

1) 5.5 FTE assigned to serials maintenance

2) 6600 active titles received

(5.5 x 2000) /6600 = 1.7 hours per title

4. Lawrence Radiation Lab

Staffing/serials received

1) 2 FTE assigned to serials maintenance

2) 3500 active serials received

(2 x 2000) / 3500 = 1.14 hours per title

5. University of Minnesota Biomed Library

Staff salaries/serials received

1) $12,000 total staff salaries (assumes librarian spends 1/2 time on maintenance activities)

2) 2500 active serials received

3) cost per title in 1968

$12,000 / 2500 = $ 4.80 per title

4) cost per title in 1976 at 6% inflation

$4.80 x 1.50 = $ 7.20

TABLE V-A

SANTA BARBARA TITLES

		N	Overlap with UCLA (percentage of 285)
	Listed in UCULS	162	57%
less:	No longer rec'd	3	
		159	56%
less:	Could not be located	5	
		154	54%
less:	Too many vols. missing for circ. count (more than 2)	3	
		151	53%
less:	Circ data not avail	4	
		147	52%
less:	Used on reserve	3	
		144	51%
Total held at UCLA, listed in UCULS, currently rec'd, located at Santa Barbara with circ. data available for at least 3 volume years		144	51%

TABLE V-B

RIVERSIDE TITLES

		N	Overlap with UCLA (i.e. percentage of 285)
	Listed in UCULS	153	54%
less:	No longer rec'd	3 150	53%
less:	Could not be located	14 136	48%
less:	Too many vols. missing for circ. count (more than 2)	4 132	46%
less:	Circ data not avail	6 126	44%
Total held at UCLA, listed in UCULS, currently recd, located at Riverside with circ. data available for at least 3 volume years		126	44%

TABLE V-C

SAN DIEGO TITLES

		N	Overlap with UCLA (percentage of 285)
	Listed in UCULS	79	28%
less:	No longer rec'd	5	
		74	26%
less:	Could not be located	3	
		71	25%
less:	Too many vols. missing for circ. count (more than 2)	3	
		68	24%
less:	Circ. data not available	7	
		61	21%
Total held at UCLA, listed in UCULS, currently rec'd, located at San Diego, with circ. data available for at least 3 volume years.		61	21%

TABLE V-D

IRVINE TITLES

	N	Overlap with UCLA (i.e., percentage of 285)
Listed in UCULS	90	32%
Detailed data on titles not collected at Irvine. If we assume the average "drop out rate" of the other campuses, (7%), the estimated number of titles meeting the criteria of currently rec'd, listed in UCULS, held at UCLA, circ. data avail for at least 3 years would be	71	25%

TABLE V-E

RESULTS OF CIRCULATION: IN-HOUSE USE SUBSTUDY

(1) Total observed or estimated circulations per title	(2) Number of titles	(3) Estimated average total in-house uses per title	(4) Estimated total uses per title: col 1 + col 3	(5) Predicted total uses per title assuming 3.5 uses per circ. Thus, 4.5 x circ=
0	36	1.5	1.5	0
1	19	4.7	5.7	5.5
2	6	13.0	15.0	9.0
3	10	17.0	20.0	13.5
4	11	13.6	17.6	18.0
5	7	17.5	22.5	22.5
6	9	20.4	26.4	27.0
7	5	18.9	25.9	31.5
8	7	20.0	28.0	32.5
9	2	32.4	41.4	40.5
10+	22	33+	43+	45+

See following notes for explanation of each column

Notes for Table V-E

Column 1: Observed means counted in all 5 volumes. Estimated means that the average number of circulations for those volumes present was multiplied by 5.

Column 2: Number of titles having that level of circulation.

Column 3: Estimate was calculated by dividing observed number of in-house reshelvings by .628, which is the total percentage of all in-house reshelvings that occurred on days that observations were made during the study period.

Column 4: This is the sum of column 1 and column 3 for each level of circulation. We may interpret this column and column 5 to mean that for a given number of circulations (regardless of time period covered) we would predict the following number of total uses.

Column 5: Assumes 3.5 uses per circulation. Total use =

4.5 x number of circulations

TABLE V-F

CUMULATIVE PERCENTAGE OF TITLES

HAVING A GIVEN LEVEL OF USE

(1) Circulation*	(2) Total Demand**	(3) UCSB	(4) UCR	(5) UCSD	(6) TOTAL
		Cumulative percentage of subscriptions to titles having total demand shown in col. 2 and circulation shown in col. 1			
0	0.0	17	12	39	19
1	16.5	23	18	56	27
2	33.0	31	22	70	35
3	49.5	36	25	74	39
4	66.0	44	29	79	45
5	82.5	47	33	84	49
6	99.0	51	37	84	51
7	115.5	54	39	85	54
8	132.0	57	43	89	58
9	148.5	58	45	89	59
10	165.0	59	47	93	61
11	181.5	64	48	95	64
12	198.0	65	53	95	66
13	214.5	67	56	97	68
14	231.0	70	59	100	71
15	247.5	73	60		73
16	264.0	74	61		74
17	280.5	77	61		76
18	297.0	78	64		77
19	313.5	81	67		79
20+	330.0+	100	100		100
		N= 144	126	61	331

* Number of observed or estimated total circulations for the '70 - '74 volumes.

** Projected total demand for volumes received in next 10 years. This figure is computed by multiplying circulation (column 1) by the factor used to estimate total use from circulation (4.5; see p 52.) and by the factor used to estimate future demand for volumes to be received in the next 10 years (3.67; see pp. 53-54). Hence column 2 = column 1 x 16.5.

TABLE V-G

NUMBER OF TITLES AT EACH LIBRARY WHOSE

COST PER USE EXCEEDS COST PER LOAN

	Schools							
	UCSB		UCR		UCSD		TOTAL	
Assumptions	N	%*	N	%*	N	%*	N	%*
1. Values derived for cost per loan cost of owning, total demand are valid.	66	46%	42	33%	51	84%	159	48%
2. Acid test. Costs equal only binding and subscription.	55	38%	37	29%	47	77%	139	42%
3. 50% error (favoring owning) in values of cost per loan, cost of maintaining, total demand.	37	26%	30	24%	36	59%	103	31%

* % represents the percentage of that school's overlap holdings or the total overlap

APPENDICES

APPENDIX A

TOTAL COST OF OWNING

Section III identified the variables and the estimated values to be used in this study for computing the cost of maintaining and processing a periodical subscription after it has been acquired and cataloged. The total cost of maintaining each title in this study was computed as follows:

1. The annual subscription cost was identified by examining the UCLA serial subscription records for 1976. For the few titles whose cost could not be obtained directly from those records because it was part of a membership package, the estimated cost was obtained by examination of the volume itself. The cost of periodicals received free or as an exchange was recorded as zero.

2. The number of issues per year was obtained from the UCLA Ed/Psych serial records.

3. The total annual cost of processing each periodical was computed using the values in Table III-A in the equation

$$CoP = (SR \times IL \times SB)\frac{(I(R) + I(C) + RN + BP)}{60} + BD + S$$

where:

CoP = cost of processing

SR = Salary rate ($4.00/hr)

IL = indirect labor (1.5)

SB = salary related benefits (1.15)

I = number of issues received per year

R = Time for receiving and record keeping per issue (6.5 min.)

C = Time for claiming per issue (.75 min)

RN = time for renewal (15 min)

BP = time for bindery preparation (20 min)

BD = Cost of binding ($6.70)

S = Cost of storage (per year) (.75)

This equation was reduced algebraically to

$$I \times .80 + \$11.00$$

when computing the annual cost of processing each title. This cost was rounded to the nearest dollar.

4. The total cost of the annual maintenance of each title was computed as the cost of processing plus the cost of the subscription. This cost was rounded to the nearest dollar.

The average annual cost of processing all commonly held titles examined in this research was found to be $15.00.

The average annual subscription cost of these same titles was also found to be $15.00.

The average annual cost of owning, exclusive of the initial cataloging and acquisition cost was, therefore, found to be $30.00.

APPENDIX B

ESTIMATING TOTAL CIRCULATION WHEN VOLUMES ARE MISSING

First, the total number of circulations for those volumes that were present was summed and divided by the total estimated years of volume availability for those same volumes. Volume availability was computed as follows: each volume was assumed to be bound and available for circulation one year after its year of issue (i.e., the 1970 volume was assumed to be bound and available for circulation in 1971). Total years of availability for a volume was assumed to be equivalent to the total number of years from a volume's first year of availability through 1975. Thus, the 1970 volume was assumed to have 5 years of availability through 1975 (i.e., was available in 1971, 1972, 1973, 1974, and 1975), the 1971 volume was assumed to have 4 years of availability through 1975, etc.

The total number of circulations of the volumes present (TC), divided by the total years of availability of those volumes (TA) thus yields the average number of circulations per year of volume availability (Y) for the 1970-1974 volumes of each title. To estimate total circulation of the 1970-1974 volumes for a title when some volumes are missing, the average circulation per year was multiplied by 15, which is the total year of volume availability (TA) when all 5 volumes are present through 1975.

The following example illustrates the procedure. Suppose the 1973 volume is missing from the shelf at the time the circulation data is recorded and the following data is recorded for the volumes present:

Vol.	No. of Circs	Total years of availability through 1975 of volumes present
70	7	71, 72, 73, 74, 75 = 5
71	4	72, 73, 74, 75 = 4
72	4	73, 74, 75 = 3
73	missing	
74	0	75 = 1
	15	13

1. Total circulations of volumes present (TC) = 15
2. Total years of volume availability of volumes present (TA) = 13
3. Average circulations per year of volume availability for volumes present

$$\frac{TC}{TA} = Y = 1.15$$

4. Total years of volume availability if all 5 volumes are present thru 1975 = 15
5. Estimated total use for all 5 volumes thru 1975

$$15 \times Y = 17.3$$

An alternative procedure employed was to include data from the '68 and/or the '69 volumes, with data from the '70-'74 volumes present. The average circulation per year of

volume availability (Y) for these volumes was computed and the result again multiplied by 15 to estimate total circulations through 1975. When both methods could be used for the same title, the higher result was taken as the estimate of use.

The major weakness of this procedure is that it assumes that a volume is available a year after its nominal date of issue. This will not always be the case, however, because some volumes are delayed in binding because of missing issues or for other reasons. A check of the binding records for each volume is the only way to determine the exact years of availability and such records do not always go back far enough at all libraries. For this study, the time required to obtain that data was prohibitive. The result is that for some titles with missing volumes the total circulation could be underestimated. Balancing this is the fact that those titles bound on a fiscal year basis will often be available before the assumed first year of bound availability. The result for these volumes is a possible overestimation of use.

There is no satisfactory solution to this problem short of an analysis at each library of the average time lag between year of issue and date of binding. For this report we shall have to assume that the different effects resulting from fiscal year and calendar year binding schedules

are counterbalancing when the study group of 331 periodicals is considered as a whole.

APPENDIX C

ESTIMATING DEMAND FOR VOLUMES RECEIVED IN THE NEXT TEN YEARS

The problem is to estimate the total number of circulations of the volumes received in the next ten years based upon the observed (or estimated) circulations of the volumes received in the previous five years. That is, what level of circulation would we predict for volumes received in 1975-1984 based upon the known circulation of volumes received in 1970-1974? In the discussion we shall use the term "volume 1" to refer to the volume received in the first year after the prediction is made, "volume 2" to refer to the volume received in the second year after the prediction, etc. Similarly, year 5 will refer to the 5th calendar year after the prediction.

ASSUMPTIONS

1. That the observed or estimated number of circulations during 1971-1975 is equal to the total number of circulations for each title during 1970-1974. The effect of this assumption is to contend that the total number of circulations of a periodical from the time its first unbound issue is received and continuing through the end of the 5th year after that receipt (in effect, years '70-'74) is equal to the total number of circulations for years 2-6 ('71-'75 in the study).

There was no data gathered in this study to support or deny this assumption, because unbound use was not studied. To accept it we have to assume that the total number of circulations per year of all unbound issues of a periodical would not cause the total circulation for years 1-5 to be significantly different from the total circulations for years 2-6. Again this is an assumption requiring confirmation by an appropriate use study.

2. That data collected on the total number of circulations of volumes received in the previous 5 years (vols. '70-'74 in this study) can be used to predict the number of circulations of the volumes to be received in the next 5 years. We further assume that the total number of circulations will be the same for both groups. In effect, we shall assume that if total circulation for the previous 5 years worth of volumes is X, that the total circulation demand for the next 5 years worth of volumes will also be X.

3. That if circulation for vols. 1-5 during years 1-5 is X, that the predictive relationship holds and that the total circulation for vols. 6-10 during years 6-10 will also be X.

4. That if circulation for vols. 1-5 during years 1-5 is X, that circulation for vols. 1-5 during years 6-10 will be 1.67X. This prediction rests on the assumption that the average number of circulations per year of volume availability (see Appendix B) for vols. 1-5 will remain constant during

years 6-10.

This assumption leads us into the issue of decline in use of a volume over time. The most thorough analysis of this problem has been presented by Line and Sandison. While these authors have raised important questions about any automatic assumptions that the use of a title declines over time, their review does reveal a preponderance of valid studies showing some decay in the average annual use of a volume over several years. The problem for this study is that we have no way to predict the rate of decline for titles in this particular study group. This is important because, as Line and Sandison have noted, this rate will differ among fields and among volumes. As indicated previously, we shall therefore pick the assumption that favors owning. Hence we shall assume no decline during the ten-year period. If a title's average annual use per year of volume availability is y for years 1-5 (when total years of volume availability is assumed to be 15), then total use during years 6-10 is

$$\frac{25y}{15y} = 1.67 \text{ of total use during years 1-5}$$

One other alternative would be to assume that the average annual use per year of volume availability during years 6-10 actually increases. To test this assumption the author examined a random sample of forty volumes drawn from the Riverside and Santa Barbara lists and recorded total

circulations for these titles for the '65-'69 volumes. These observations yielded the total circulations of these 5 volumes for each title for ten years. The average annual circulation per year of volume availability was one-third lower for these volumes than the same average for the '70-'74 volumes. This finding can be interpreted in two ways, of course. One might conclude with equal justification that the average annual use of the '70-'74 volumes had actually increased or that the average annual use of the '65-'69 volumes had declined. Nevertheless, in the light of other studies suggesting some decay in use over time, it does support the assumption made here that the average annual use of volumes 1-5 during years 6-10 would not be likely to increase.

Taking assumptions 1-4 above, we may conclude that if X = the total number of circulations for the volumes received in the previous 5 years, that the total number of circulations of vols. 1-10 during years 1-10 will be 3.67X. Figure C-1 presents this relationship graphically.

FIGURE C-1

PROJECTING TOTAL CIRCULATIONS OF

VOLUMES 1-10 FOR YEARS 1-10

Assume

X = total circulations observed for volumes received in last 5 years

Y = average annual circulation per year of volume availability for these volumes

Z = total circulations predicted for volumes received in next 10 years

-5,-4,-3,-2,-1 represent last 5 years (71-75 in this study)

A, B, C, D, E represent bound volumes received in last 5 years (vols 70-74 in this study)

Prediction

			Years before prediction					Years after prediction									
			-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
	Rec'd prior to pred.	A	Y	Y	Y	Y	Y										
		B		Y	Y	Y	Y										
V		C			Y	Y	Y										
		D				Y	Y										
O		E					Y										
		1						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
L		2							Y	Y	Y	Y	Y	Y	Y	Y	Y
	Rec'd after pred.	3								Y	Y	Y	Y	Y	Y	Y	Y
U		4									Y	Y	Y	Y	Y	Y	Y
		5										Y	Y	Y	Y	Y	Y
M		6											Y	Y	Y	Y	Y
		7												Y	Y	Y	Y
E		8													Y	Y	Y
		9														Y	Y
S		10															Y

Hence

X = 15 Y

Z = 55 Y

Z = 3.67 X

APPENDIX D

IDENTIFYING INDIVIDUAL TITLES WHOSE COST PER USE IS GREATER THAN THEIR COST PER LOAN OVER TEN YEARS

THE DATA

The data sheets that follow contain in

Column 1: the title of each periodical in the study group of 285

Column 2: the subscription cost of each title

Column 3: the number of annual issues of each title

Columns 4-5-6: the number of circulations recorded for the '70-'74 volumes of each title (if held) at
Santa Barbara (Column 4)
Riverside (Column 5)
San Diego (Column 6)

Column 7: An indication of whether the title is held at Irvine according to the UCULS.

THE CONDITIONS

Table D-1 identifies in

Column 1: the observed or estimated total circulation of the '70-'74 volumes

Column 2: the projected total demand for the volumes received in the next 10 years, based upon the circulation level shown in column 1.

Column 3: the total cost of owning above which a title is more economically borrowed, assuming the cost per loan, cost of owning, and projected demand used in this study are valid.

Column 4: the cost of the subscription above which a title is more economically borrowed, using the "acid test of savings."

Column 5: the total cost of owning above which a title is more economically owned, assuming a 50% error in the cost per loan, cost of processing and projected demand. S = cost of the subscription.

PROCEDURES

1. For each level of circulation (Table D-1, col. 1) determine the cost at which borrowing and owning are indifferent for a given set of assumptions (columns 3, 4, 5).

2. Using the data sheets for each title in this appendix, compute each title's cost of processing and total cost of owning (see Appendix A) and record the number of titles whose cost of owning or cost of subscription, as appropriate, is above the indifference point identified in Table D-1, and therefore is more economically borrowed.

3. Divide the total found in step 2 above by 331 to compute the total percentage of titles more economically borrowed than owned.

4. Repeat steps 1-3 for each set of assumptions represented in columns 3-5 of Table D-1.

DERIVATION OF THE VALUES OF COLUMNS 3-5, TABLE D-1

CoO = cost of owning

TD = total demand

SC = subscription cost

BC = binding

Column 3:

$$\frac{10\ CoO}{TD} = 3$$

$$CoO = .3\ TD$$

Column 4:

$$\frac{10\ (SC + BC)}{TD} = 3$$

$$SC = .3TD - BC \quad \underline{or} \quad SC = .3TD - \$6.70$$

Column 5:

$$\frac{10 \quad CoO - \frac{1}{2}\ (CoO - SC)}{1.5\ TD} = 4.5$$

$$CoO = 1.35\ TD - SC$$

TABLE D-1

COST OF OWNING ASSOCIATED WITH THE INDIFFERENCE POINT FOR EACH LEVEL OF USAGE

(1) Circulation	(2) Total demand	(3) Derived values valid	(4) Acid test	(5) 50% error
0	0	0	*	*
1	16.5	5	*	22-s$
2	33.0	10	3	45-s
3	49.5	15	8	67-s
4	66.0	20	13	89-s
5	82.5	25	18	111-s
6	99.0	30	23	134-s
7	115.5	35	28	156-s
8	132.0	40	33	178-s
9	148.5	45	38	200-s
10	165.0	50	43	223-s
11	181.5	55	48	244-s
12	198.0	59	53	267-s
13	214.5	64	58	290-s
14	231.0	69	63	312-s
15+	247.5+	74	68	334-s

$ s = cost of subscription

* costs of binding are such that even titles with a subscription cost of zero, at this level of use, titles are more economically borrowed than owned

See additional notes on following page

Notes for Table D-1

Column 1 = number of observed or estimated total circulations for '70-'74 volumes.

Column 2 = projected total demand for volumes to be received in next 10 years.

Column 3 = indifferent cost of owning when all derived values (cost of owning, cost per loan and projected total demand) are assumed valid.

Column 4 = indifferent cost of subscription when only costs of owning are cost of subscription and cost of binding.

Column 5 = indifferent cost of owning when 50% error (favoring owning) are assumed for all derived values.

RE zero projected total demand

Even if we were to project 3.5 total uses for a title with zero circulation, the effect on the total number of subscriptions more economically borrowed would be negligible. It would lower that total from 31% to 30%.

BASIC DATA SHEETS

CONTENTS:

Titles in the study group held by UCLA and at least one other southern campus.

COLUMNS:

1: title of periodical
2: annual subscription to nearest dollar
3: number of issues per year
4: total circulation through 1975 of the 1970-1974 vols at UCSB
5: total circulation through 1975 of the 1970-1974 vols at UCR
6: total circulation through 1975 of the 1970-1974 vols at UCSD
7: titles held at UCI, according to UCULS

SYMBOLS:

A = could not be located although shown to be held according to UCULS
B = confirmed to be no longer received
C = too many volumes missing (more than 2) for circulation count
D = circulation data not available
R = used on reserve
X = held by UCI according to UCULS
Blank = not held according to UCULS

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
AAUP BULLETIN	10	4	4	1	0	X
AV COMMUNICATION REVIEW	20	4	8	5	7	X
ACADEMIC THERAPY	15	6	20			
AMERICAN BIOLOGY TEACHER	18	12	3	12		X
AMERICAN EDUCATION	14	10	17			
AMERICAN SCHOOL AND UNIVERSITY	15	12	1	7	0	X
AMERICAN SCHOOL BOARD JOURNAL	18	12	5	28	1	X
ARITHMETIC TEACHER	13	8	18	18		X
ART EDUCATION	15	9	0	4		
ART AND ACTIVITIES	9	10	2			
ATHLETIC JOURNAL	5	10	19	18	1	X
AUDIO VISUAL INSTRUCTION	18	10		23	A	X
AUDIO VISUAL LANGUAGE JOURNAL: JOURNAL OF APPLIED LINGUISTICS AND LANGUAGE TEACHING TECHNOLOGY	7	3			0	
BRITISH JOURNAL OF EDUCATIONAL PSYCHOLOGY	14	3	10	13	2	X
BRITISH JOURNAL OF EDUCATIONAL STUDIES	20	3	0	2		X
BUSINESS EDUCATION FORUM	0	8		B		X
CTA ACTION	0	12		D		
CALIFORNIA ENGLISH	10	6	3	6		
CALIFORNIA JOURNAL OF EDUCATIONAL RESEARCH	10	4	24	22	0	X

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
CALIFORNIA PIONEER TEACHER	0	4		D		
CALIFORNIA SCHOOL BOARDS	8	10	8			
CALIFORNIA. UNIVERSITY. UNIVERSITY BULLETIN	0	25	D	D	A	X
CHANGE MAGAZINE	11	10	7	8	0	X
CHILDHOOD EDUCATION	18	6	14	37		X
CHINESE EDUCATION	70	4	2	0		
CLEARNIGHOUSE. A JOURNAL OF MODERN JUNIOR AND SENIOR HIGH SCHOOLS	10	9		37		
COACH AND ATHLETE	5	12	13			
COLLEGE AND UNIVERSITY	6	4			2	X
COLLEGE AND UNIVERSITY BULLETIN	20	10	A	A		
COLLEGE BOARD REVIEW	2	4	1	0		
COLLEGE COMPOSITION AND COMMUNICATION	5	5	4	4	1	X
COLLEGE ENGLISH	15	8	17	24	11	X
COLUMBIA UNIVERSITY. TEACHERS COLLEGE. INSTITUTE OF ADMINISTRATIVE RESEARCH. BULLETIN.	5	4	0	A		
COMMUNITY AND JUNIOR COLLEGE JOURNAL	8	9	4	11	0	X
COMPACT	6	6	6			
COMPARATIVE EDUCATION REVIEW	15	3	11	3		X
CONTEMPORARY EDUCATION	7	4	2	14		

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
COUNCIL FOR BASIC EDUCATION. BULLETIN.	4	10	A	D		X
DATA PROCESSING FOR EDUCATION	40	12	A	A	B	X
DELTA KAPPA GAMMA BULLETIN	0	4	2	6		
DURHAM RESEARCH REVIEW	0	2		0		
EDUCATION	12	4	25	33	4	X
EDUCATION AND CULTURE; REVIEW OF THE COUNCIL FOR CULTURAL COOPERATION OF THE COUNCIL OF EUROPE AND THE EUROPEAN CULTURAL FOUNDATION	0	3	D			
EDUCATION AND TRAINING OF THE MENTALLY RETARDED	13	4	6	16		
EDUCATION AND URBAN SOCIETY	20	4	7	19		
EDUCATION CANADA	5	4	0	0		
EDUCATION DIGEST	8	9	13	A		X
EDUCATION LIBRARIES BULLETIN	4	3			0	
EDUCATION NEWS	0	3	0			
EDUCATION OF THE VISUALLY HANDICAPPED	6	4		7		
EDUCATION QUARTERLY (India (republic) Ministry of Education.)	0	4		0		
EDUCATIONAL ADMINISTRATION QUARTERLY	10	3	11	C		X
EDUCATIONAL AND PSYCHOLOGICAL MEASUREMENT	20	4	19	14	10	X
EDUCATIONAL FORUM	7	4	11	19	B	X

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
EDUCATIONAL HORIZONS	5	4	0	1		
EDUCATIONAL LEADERSHIP	4	8	14	60	0	X
EDUCATIONAL PRODUCT REPORT	50	9	4			
EDUCATIONAL RECORD	10	4	22	12	1	X
EDUCATIONAL RESEARCH	11	3		12		X
EDUCATIONAL REVIEW	6	3		6		
EDUCATIONAL STUDIES IN MATHMETICS	52	4	4	0	0	X
EDUCATIONAL TECHNOLOGY	25	12	17	50		X
EDUCATIONAL THEORY	10	4	3	12	0	X
ELEMENTARY ENGLISH	20	8	32	71		X
ELEMENTARY SCHOOL JOURNAL	12	8	25	36	3	X
ENGLISH EDUCATION	5	3			0	
ENGLISH JOURNAL	15	12	43	65	4	X
ENGLISH LANGUAGE TEACHING JOURNAL	10	4			2	
EXCEPTIONAL CHILDREN	20	8	27	100	D	X
FORUM FOR THE DISCUSSION OF NEW TRENDS IN EDUCATION	8	3	0			
FOUNDATIONS OF LANGUAGE	54	4	15	5	38	X
GENERAL LINGUISTICS	13	4	0	0	2	X
GIFTED CHILD QUARTERLY	20	4	11	22	8	
HARVARD EDUCATIONAL REVIEW	14	6	29	100	13	X
HIGH SCHOOL JOURNAL	0	12	9	34		

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
HIGHER EDUCATION AND RESEARCH IN THE NETHERLANDS	0	4	0			
HIGHER EDUCATION REVIEW	17	3		0		
HISTORY OF EDUCATION QUARTERLY	18	4	0	1	1	X
THE HISTORY TEACHER	10	4	0			
ILLINOIS SCHOOLS JOURNAL	4	4	1			
IMPROVING COLLEGE AND UNIVERSITY TEACHING	9	4	5	3	0	X
INDEPENDENT SCHOOL BULLETIN	7	4	5			
INDUSTRIAL EDUCATION	9	9	A			
INSTRUCTOR	10	9	27	62		X
INTEGRATED EDUCATION	10	6	6	18	0	X
INTELLECT	17	12	37	C	3	X
INTERCHANGE	10	4	B	C		
INTERNATIONAL ASSOCIATION OF UNIVERSITIES. BULLETIN	0	4	0		0	
INTERNATIONAL EDUCATIONAL AND CULTURAL EXCHANGE	6	4	4			
INTERNATIONAL JOURNAL OF HEALTH EDUCATION	10	4	1		D	
INTERNATIONAL REVIEW OF EDUCATION	20	4	3	3		
JOURNAL FOR SPECIAL EDUCATORS OF THE MENTALLY RETARDED	9	3	8			
JOURNAL OF AESTHETIC EDUCATION	8	4	4	5	0	

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
JOURNAL OF AMERICAN INDIAN EDUCATION	4	3	4			
JOURNAL OF BUSINESS EDUCATION	8	8	0			
JOURNAL OF COLLEGE STUDENT PERSONNEL	15	6	D			
JOURNAL OF COMMUNICATIONS DISORDERS	35	4	16		D	
JOURNAL OF EDUCATION (Boston)	10	4	1	4	1	X
JOURNAL OF EDUCATIONAL ADMINISTRATION	6	2	7			
JOURNAL OF EDUCATIONAL ADMINISTRATION AND HISTORY	6	2	0	2		
JOURNAL OF EDUCATIONAL DATA PROCESSING	11	6	1	A		X
JOURNAL OF EDUCATIONAL MEASUREMENT	15	4	28	19		
JOURNAL OF EDUCATIONAL PSYCHOLOGY	30	6	D	A	10	X
JOURNAL OF EDUCATIONAL RESEARCH	15	9	21	A	2	X
JOURNAL OF EDUCATIONAL THOUGHT	6	3	1			
JOURNAL OF EXPERIMENTAL EDUCATION	13	4	20	A	2	X
JOURNAL OF GENERAL EDUCATION	9	4	2	1	1	X
JOURNAL OF HIGHER EDUCATION	12	9	21	B	C	X
JOURNAL OF LEARNING DISABILITIES	12	10	33	40		

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
JOURNAL OF NEGRO EDUCATION	8	4	3	2		X
JOURNAL OF READING	15	8	37	84		X
JOURNAL OF READING BEHAVIOR	13	4	C	21		
JOURNAL OF RESEARCH AND DEVELOPMENT IN EDUCATION	10	4	14	20		X
JOURNAL OF RESEARCH IN SCIENCE TEACHING	24	4	6	8	1	
JOURNAL OF SCHOOL HEALTH	20	10	20	23	D	
JOURNAL OF SCHOOL PSYCHOLOGY	35	4	11	20	10	
JOURNAL OF SPECIAL EDUCATION	19	4	17	32		
JOURNAL OF SPEECH AND HEARING DISORDERS	28	4	R	24	D	X
JOURNAL OF SPEECH AND HEARING RESEARCH	28	4	R	10	D	
JOURNAL OF TEACHER EDUCATION	8	4	22	14	2	X
JOURNAL OF VERBAL LEARNING AND VERBAL BEHAVIOR	45	6	60	62	C	X
KAPPA DELTA PI RECORD	2	4	0	1		
LANGUAGE	40	4	19	7	60	X
LANGUAGE LEARNING	8	2		9	8	X
LANGUAGE QUARTERLY	5	4		3		
LANGUAGE SCIENCES	6	5		1		
LEARNING AND MOTIVATION	42	4	17	A		
LIBERAL EDUCATION	5	4	2	0	0	X
LEARNING TODAY	12	4	0	1	0	X
McGILL JOURNAL OF EDUCATION	3	2		0		

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
MATHMEMATICS TEACHER	13	8	14	20	0	X
MEASUREMENT AND EVALUATION IN GUIDANCE	12	4		12		
MEDIA AND METHODS	18	9	3			X
MENTAL RETARDATION	22	6		37		
MOMENTUM	6	4		A		
MONTANA EDUCATION	4	12		A		
NATIONAL ASSOCIATION FOR WOMEN DEANS, ADMINISTRATORS, AND COUNSELORS. JOURNAL	9	4	C	2		X
NATIONAL ASSOCIATION OF COLLEGE ADMISSIONS COUNSELORS. JOURNAL	10	4	0			
NATIONAL ASSOCIATION OF INDEPENDENT SCHOOLS	7	4				
NATIONAL ASSOCIATION OF SECONDARY PRINCIPALS. BULLETIN	30	9	12	64	B	X
NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND GRANT COLLEGES. CIRCULAR LETTER	0	20	0	A	A	
NATIONAL ELEMENTARY PRINCIPAL	24	5	10	45		
NORTH CENTRAL ASSOCIATION QUARTERLY	6	4	0	2		
OHIO SCHOOLS	7	18		0		
ORBIT	5	5	0	D		X
PEABODY JOURNAL OF EDUCATION	10	4	8	26		X
PENNSYLVANIA SCHOOL JOURNAL	6	4		A		
PERSONNELL AND GUIDANCE JOURNAL	20	10	25	31	2	X

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
PHI DELTA KAPPAN	7	10	15	52	5	X
PHYSICAL EDUCATOR	8	4	14	14		
PHYSICS TEACHER	15	9	8	1	1	X
PROGRAMMED LEARNING AND EDUCATIONAL TECHNOLOGY	11	6	2	6	5	X
PSYCHOLOGY IN THE SCHOOLS	25	4	19	24	5	
READING (United Kingdom Reading Association)	16	3		4		
READING IMPROVEMENT	8	4	7			
READING RESEARCH QUARTERLY	15	4	24	20		X
READING TEACHER	15	8	16	85		X
REMEDIAL EDUCATION	9	3		0		
RESEARCH IN EDUCATION (Manchester)	11	2		5		
RESEARCH IN THE TEACHING OF ENGLISH	5	3		13		
RESEARCH REPORTER	0	4	B			
SCHOLASTIC COACH	6	10	22	23	0	X
SCHOOL ADMINISTRATOR	5	11	2			X
SCHOOL AND COMMUNITY	5	9	11	14		
SCHOOL ARTS	9	10	2	10	0	X
SCHOOL COUNSELOR	10	5	21			
SCHOOL REVIEW	16	4	12	20	0	X
SCHOOL SCIENCE AND MATHEMATICS	10	8	5	12		X

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
SCIENCE AND CHILDREN	14	8	1	13		
SCIENCE EDUCATION	25	4	6	9	B	
SCIENCE TEACHER	25	9	2	15		
SENIOR SCHOLASTIC. TEACHER'S EDITION	7	20		D		
SOCIAL EDUCATION	10	8	2	8	2	X
THE SOCIAL STUDIES	9	6	4	A	0	X
SOCIAL STUDIES REVIEW	11	7	0	0	4	
SOCIOLOGY OF EDUCATION	16	4	20	20		X
SOVIET EDUCATION .	110	12	2	5		X
SPECIAL EDUCATION/ FORWARD TRENDS	10	4			D	
STUDIES IN ART EDUCATION	15	3	1			
STUDIES IN PHILOSOPHY AND EDUCATION	9	4	0			X
TEACHER	10	9	R	37		
TEACHERS COLLEGE RECORD	12	4	11	30	1	X
TEACHING EXCEPTIONAL CHILDREN	15	4		12		
TEXAS OUTLOOK	4	12		B		
THEORY INTO PRACTICE	5	5	4	8		X
TODAY'S EDUCATION	7	4	21	40	C	X
TRAINING AND DEVELOPMENT JOURNAL	20	12			B	
TRENDS IN EDUCATION	4	4	4			
UCLA EDUCATOR	0	2	A			

BASIC DATA

(1) Title	(2) Sub Cost	(3) Issues /Year	(4) Circ UCSB	(5) Circ UCR	(6) Circ UCSD	(7) UCI
UNIVERSITY QUARTERLY	11	4	4	4	0	X
UNIVERSITY AFFAIRS	5	10	0			
URBAN EDUCATION	20	4	7	18		
URBAN REVIEW	18	4	C	C		
VIEWPOINTS	8	6	0	8		
VIRGINIA JOURNAL OF EDUCATION	6	9		0		
VOCATIONAL GUIDANCE QUARTERLY	10	4	15		0	X
WESTERN EUROPEAN EDUCATION	70	4	3			
WISCONSIN JOURNAL OF EDUCATION	0	9		0		
YOUNG CHILDREN	10	6	B			
YOUTH AND SOCIETY	20	4	19	9		X

BIBLIOGRAPHY

Bourne, Charles P. and Gregor, Dorothy. Methodology and Background Information to Assist the Planning of Serials Cancellation and Cooperative Serials Collection in the Health Sciences. Berkeley: University of California: Institute of Library Research, 1975.

California. Department of Finance. Program Review Branch. Audit Division. Library Cooperation: A Systems Approach to Interinstitutional Resource Utilization. Sacramento: California Department of Finance, 1973.

California. University. Charge to the Steering Committee for Systemwide Library Policy Implementation. Berkeley: University of California, 1975.

California. University. Library Policy Task Force. Report of the Library Policy Task. University of California Library Policy to 1980-81. Berkeley: University of California, 1974.

California. University. University-Wide Library Automation Program, University of California Union List of Serials. Berkeley, 1973.

Evans, G. Edward. "The California State Department of Finance Report. Analysis of 'Library Cooperation: A Systems Approach to Interinstitutional Resource Utilization.'" California Librarian, 34 (April 1973), 4-15.

Fayollat, James. "On-Line Serials Control System in a Large Biomedical Library." Journal of American Society for Information Science, 24 (1973), 80-86.

Fussler, Herman and Simon, Julian. Patterns in the Use of Books in Large Research Libraries. Chicago: University of Chicago Press, 1969.

Grosch, Audrey. "University of Minnesota Bio-Medical Library Serials System." Special Libraries, 60 (1969), 349-360.

Hayes, Robert M. and Becker, Joseph. Handbook for Data Processing for Libraries. Los Angeles: Melville, 1974.

Hayes, Robert M. Final Report on a Study of a System for Interlibrary Communication (SILC). Los Angeles: Becker and Hayes, 1973.

Jain, A. K. "Sampling and Short-Period Usage in the Purdue Library." College and Research Libraries, 27 (1966), 211-218.

----------. A Statistical Study of Book Use. Lafayette, Indiana: Purdue University, 1967.

----------. "Sampling and Data Collection Methods for a Book-Use Study." Library Quarterly, 39 (1969), 245-252.

Koenig, Michael. "SCOPE: A Cost Analysis of an Automated Serials Record System." Journal of Library Automation, 4 (1971), 129-140.

Libraries at Large. Tradition, Innovation, and the National Interest. Douglas Knight and E. Shepley Nourse, ed. New York: Bowker, 1969.

Leimkuhler, Ferdinand and Cooper, Michael D. Cost Accounting and Analysis for University Libraries. Berkeley: University of California, 1970.

Line, Maurice and Sandison, Alexander. "Progress in Documentation. 'Obsolescence' and Changes in the Use of Literature with Time." J. Doc. 30 (1974), 285-350.

Martel, Charles. Document Availability and Use Patterns at the University of California, Berkeley Library: A Comparison with California State University, Sacramento. Berkeley: University of California, Institute of Library Research, 1975.

Middleswort, L. E. A Study of Book Use in the University of Chicago Library, unpublished M.S. thesis. Chicago: University of Chicago, Graduate Library School, 1951.

Palmer, Richard. Case Studies in Library Computer Systems. New York: Bowker, 1973.

Palmour, Vernon; Bellassai, Marcia; and Gray, Lucy. Access to Periodical Resources; a National Plan. Rockville, Md.: Association of Research Libraries, 1974.

Preliminary Plan for the University of California Libraries, 1976-1986. Berkeley: University of California, Office of the Executive Director of Library Planning, January 1976.

A Study of the Characteristics, Costs and Magnitude of Interlibrary Loans in Academic Libraries. Vernon Palmour, Edward C. Bryant, Mary W. Caldwell, and Lucy M. Gray, compilers. Washington, D.C.: Association of Research Libraries, 1972.

Thompson, Donald D. and Dougherty, Richard M. Preliminary Summary Report on the Feasibility of Expanded Library Cooperation among the Northern Campuses of the University of California: A Study of Periodicals Overlap and Patterns of Use. August 1974.

Trueswell, R. W. "Determining the Optimal Number of Volumes for a Library's Core Collection." LIBRI, 16 (1966), 49-60.

----------. "User Circulation Satisfaction Versus Size of Holdings at Three Academic Libraries." College and Research Libraries, 30 (1969), 204-213.

Verity, John B. and Crocker, Elizabeth. "A Computer-Based System for Serial Records at Lawrence Radiation Laboratory." Journal of American Society of Information Science, 21 (1970), 247-253.

Voigt, M. J. "(Costs of Data Processing) in Serials Handling." College and Research Libraries, 24 (1963), 489-91.

Williams, Gordon, et al. Library Cost Models: Owning Versus Borrowing Serial Publications. Washington, D.C.: Office of Science Information Service, National Science Foundation, 1968.